CHICAGO TRANSIT AUTHORITY

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Subject: **Requisition #C13RI101382206** Furnish all components required to provide a complete power control system that will distribute power to existing stinger equipment located at CTA's 98th Street Rail Shop facility.
Minutes of the April 23, 2013 Pre-Bid Conference, Addendum No. 1, revised Title Page, complete set of revised Drawings dated 4/25/13, revised Special Conditions pages, revised Proposal Page and Meeting Attendance sheets.
Bid Opening Date: May 17, 2013

Dear Proposers:

Enclosed is a summary of the questions that arose during the Pre-Bid meeting that took place on April 23, 2013. This will serve as the official response to the questions posed. In addition, please find Addendum #1 which makes changes to the Detail Specification. Enclosed is a revised Title Page; revised Drawings dated 4/25/2013; revised Special Conditions pages and a revised Proposal Page that are to replace those pages originally sent to you. Lastly, enclosed please find a copy of the meeting attendance sheet(s) for all participants at the Pre-Bid meeting. Please take this information into consideration in preparation of your bid submittal.

It is important to identify receipt of Addendum # 1 within your bid submittal. **Acknowledgment of the Addendum is to be indicated in the space provided on the execution page(s) of the bid document filled out by your company. Failure to acknowledge receipt of the Addendum will result in finding your bid non-responsive.** Please use this information in the preparation of your bid. This is the only information which will be available in this regard.

There will be no change in the bid opening date of Friday, May 17, 2013 at 11:00 a.m. Chicago time.

Any questions regarding this bid should be referred to Ms. Greta Harris at (312) 681-2463.

Sincerely,

Robert Miller
General Manager, Purchasing

IFB NO. C13RI101382206

FURNISH ALL COMPONENTS REQUIRED TO PROVIDE A COMPLETE POWER CONTROL SYSTEM THAT WILL DISTRIBUTE POWER TO EXISTING STINGER EQUIPMENT AT CTA'S 98TH STREET RAIL SHOP FACILITY

MEETING MINUTES OF PRE-BID ON APRIL 23, 2013

Listed below are questions that CTA received from potential bidders relative to the subject IFB. The CTA's response is stated below. Please take the following information into consideration when preparing your Proposal.

Q1. How are questions to be handled after this meeting?

A1. All questions after this date must be submitted in writing to the attention of Ms. Greta Harris. The questions can be submitted either by fax or by e-mail. The fax number for questions to be sent to is (312) 681-2495 and the e-mail address for questions to be sent is gharris@transitchicago.com. The last date that CTA will accept any written questions is Friday, April 26, 2013.

Q2. Could our Engineers speak direct with CTA Engineers after this meeting?

A2. No. All questions and correspondence must be routed through Ms. Greta Harris only. No one else at the Authority is to be contacted without prior authorization from the Procurement Administrator. The purpose is to ensure that there is no misinterpretation of CTA's position or information given.

Q3. What are the DBE requirements for bidding?

A3. This requirement has a contract specific DBE goal of 0% assigned to the project. While bidders are encouraged to submit DBE participation, DBE participation is not required for their bid to be considered and will not factor in the award process.

Q4. There are multiple DBE related pages within the contract bid package that require information to be provided. In the event a Bidder is not offering any DBE participation, are we still required to complete these pages?

A4. No. In the event that a Bidder is not offering any DBE participation, the page(s) in question could be left blank and not risk having their bid disqualified. NOTE: This situation applies only to bid solicitations that have a contract specific DBE goal of 0% assigned to them.

Q5. Special Conditions: Delivery, Page SC-2: This section requires that all the components be delivered within a maximum of eighteen (18) weeks. Depending on the amount of time CTA takes to approve the catalog cut sheets, that time frame will be difficult to meet. Would CTA consider extending the maximum lead time an additional four (4) weeks?

A5. Yes. CTA will change the maximum lead time for delivery from eighteen (18) weeks to twenty-two (22) weeks. The Special Conditions have been revised accordingly.

Q6. Special Conditions: Qualifications, Page SC-2: This section requires a minimum of three (3) years' experience in the design of new switchboard and control equipment. While most suppliers have experience with AC switchboard manufacturing, the need for DC switchboard assemblies being requested on this requirement is something that is unusual and comes up rarely. Most suppliers would not meet the qualification requirements. Would CTA consider changing this section to require experience with AC switchboard manufacturing?

A6. Yes. Suppliers with AC switchboard manufacturing experience would meet the qualification requirements. The Special Conditions have been revised accordingly.

Q7. Special Conditions: References, Page SC-3: References in this section are required to be provided for similar switchboard and control equipment of comparable magnitude and nature that has been performed in the past three (3) years. The need for DC switchboard assemblies is unusual and rarely comes up to provide references for. Can this section be revised to require references for AC switchboard assembly work?

A7. Yes. CTA will accept references for AC switchboard assembly work. The Special Conditions have been revised accordingly.

Q8. Detail Specification No. CTA 2011-0074, Section 2.1, Item A. Page D-2: This section requires Cabinet # 1 to be 72 inch high x 24 inch wide x 24 inch deep. Could the width on this cabinet be changed to 30 inches wide?

A8. Yes. The width of Cabinet # 1 can be 30 inches wide. The Detail Specification has been revised accordingly.

Q9. Detail Specification No. CTA 2011-0074, Section 2.1, Item A. Page D-2: The DC distribution panel in this section is listed with 20 amp branch breakers to be provided. Are the branch breakers to be 2 pole?

A9. Yes. The 20 amp branch breakers are to be 2 pole. The Detail Specification has been revised accordingly.

Q10. Detail Specification No. CTA 2011-0074, Section 2.1, Item A. Page D-2: The DC control relays are listed as "3 pole double throw 24 volt". Could this be changed to 4 pole double throw 24 volt relays?

A10. Yes. The use of 4 pole double throw 24 volt relays is acceptable. The Detail Specification has been revised accordingly.

Q11. Detail Specification No. CTA 2011-0074, Section 2.1, Item B. Page D-2: Does Cabinet # 2 require that a hinged door be provided? If so, do you want it hinged on the right or left?

A11. Yes. CTA requires that the cabinet come with a hinged door and that it be hinged on the right. The Detail Specification has been revised accordingly.

Q12. Detail Specification No. CTA 2011-0074, Section 2.1, Item C. Page D-2: Does Cabinet # 3 require that a hinged door be provided? If so, do you want it hinged on the right or left?

A12. Yes. CTA requires that the cabinet come with a hinged door and that it be hinged on the right. The Detail Specification has been revised accordingly.

Q13. Detail Specification No. CTA 2011-0074, Section 2.1, Item C. Page D-2: The bus mounted fuse in this section is currently listed with a 800 amp rating, with a suggested part number of #a150x800-4. The #a150x800-4 is not available. Would CTA consider changing this to a 600 amp dc fuse?

Q13. Yes. A 600 amp dc fuse is acceptable to CTA. The Detail Specification has been revised accordingly.

Q14. Detail Specification No. CTA 2011-0074, Section 2.1, Item C. Page D-3: The last paragraph in this section currently states "Necessary bus work from main switch cubicle, resistor assembly, fuse mounting, ammeter shunt to top right hand side of enclosure for connections to contactor sections cross bus." Do you mean cable connection to contactor sections cross bus?

A14. Yes. Cable connection is what CTA intended. The Detail Specification has been revised accordingly.

Q15. Detail Specification No. CTA 2011-0074, Section 2.2, Item C. Page D-6: The DC test locations are currently listed in the Detail Specification as Track A, Track B, Track C-East, and Track C-West, yet that does not correspond to information listed on Drawing # 409. Does the Drawing supersede the specification?

A15. No, the drawing does not supersede the specification. The correct information is Track A, Track B, Track C-North, and Track C-South. Both the detail specification and drawing have been revised accordingly.

Q16. Detail Specification No. CTA 2011-0074, Section 2.4, Item A. Page D-7: This section calls for two (2) 3-pole double throw 24 volt dc relays to be provided. Could this be changed to 4 pole double throw 24 volt relays?

A16. Yes. The use of 4 pole double throw 24 volt relays is acceptable. The Detail Specification has been revised accordingly.

Q17. Detail Specification No. CTA 2011-0074, Section 2.4, Item C. Page D-7: This section calls for 30 amp 750 volt screw type terminal blocks to be provided. Could this be changed to 30 amp 600 volt screw type terminal blocks?

A17. Yes. The use of 30 amp 600 volt screw type terminal blocks is acceptable. The Detail Specification has been revised accordingly.

Q18. Detail Specification No. CTA 2011-0074, Section 2.7, Page D-7: This section requires that eight (8) warning devices be provided, yet Drawing E-404 only indicates a quantity of four (4). Which quantity is correct?

A18. CTA requires that a total of six (6) warning devices be provided, two (2) of which will be spares. The Detail Specification has been revised accordingly.

Q19. Detail Specification No. CTA 2011-0074, Section 3.2, Page D-8: This section requires that drawings be sent to the attention of CTA testing Engineer for approval. How long will CTA take to approve the drawings?

A19. CTA will make every effort to approve the drawings in a prompt manner. No change will be made to the Detail Specification.

Q20. Detail Specification No. CTA 2011-0074, Section 3.2, Page D-8: What is the e-mail address that the drawings are to be sent to?

A20. That information will be provided after the contract is awarded to the successful Contractor. No change will be made to the Detail Specification.

Q21. Detail Specification No. CTA 2011-0074, Section 5.1, Page D-8: This section requires all the components to be shipped within 14 weeks after the drawing are approved. Can that timeframe be increased to 18 weeks?

A21. CTA will increase the timeframe for the components to be shipped from 14 to 18 weeks after the drawings are approved. The Detail Specification has been revised accordingly.

Q22. Appendix B, Section 1.02, Item B, Subsection 1, Page D-17: Two of the design tests listed as b. Short circuit current test and e. Hypot test cannot be performed on this requirement. Can they be removed from the Detail Specification?

A22. Yes. Short circuit current test and Hypot test will be removed from the Detail Specification. The Detail Specification has been revised accordingly.

Q23. Appendix B, Section 1.02, Item B, Subsection 2, Page D-18: There are six types of production tests currently required in the specification, yet three of the tests listed cannot be performed. Can the requirement for Dielectric tests; Grounding tests; & Resistor operating temperature rise test be eliminated from the specification?

A23. Yes. The requirement for Dielectric tests; Grounding tests; & Resistor operating temperature rise test are not needed. The Detail Specification has been revised accordingly.

Q24. Appendix B, Section 2.01, Item D, Page D-21: This section calls for insulation rated for 2 KV. The 2 KV rating is not commercially available. Would CTA consider changing the insulation rating to 600 volt?

A24. Yes. Wiring with an insulation rating of 600 volt is acceptable. The Detail Specification has been revised accordingly.

Q25. Appendix B, Section 2.01, Item M, Page D-24: This section requires the control relay to be a three pole design. Could this be changed to a 4 pole design?

A25. Yes. A 4 pole control relay is acceptable to CTA. The Detail Specification has been revised accordingly.

Q26. Appendix B, Section 2.01, Item M, Page D-24: This section requires the contacts to be rated at 16 amps. Could this be changed to 12 amps?

A26. Yes. Contacts rated at 12 amps are acceptable to CTA. The Detail Specification has been revised accordingly.

Q27. Appendix B, Section 2.01, Item M, Page D-24: The relay type currently referred to a Cutler Hammer type D3PF has been changed to a D7PF. Would CTA revise the specification to reflect the current part number?

A27. Yes. The Cutler Hammer type D7PF relay is acceptable to CTA. The Detail Specification has been revised accordingly.

Q28. Appendix B, Section 2.01, Item Q, Page D-24: This section requires that removable lifting means be provided for the switchboard. Why is this needed?

A28. This requirement is not needed and will be removed from the Detail Specification. The Detail Specification has been revised accordingly.

Q29. Appendix D, Section 2.01, Item A, Page D-30: This section requires a relay cabinet to be provided. Why is this needed?

A29. This requirement is not needed and will be removed from the Detail Specification. The Detail Specification has been revised accordingly.

Q30. Appendix D, Section 2.02, Item A, Page D-30: This section requires the terminal to be rated at 750V. Can this rating be changed to 600V?

A30. Yes. The terminal rating should be 600 V. The Detail Specification has been revised accordingly.

Q31. Appendix D, Section 2.03, Item A, Page D-31: This section requires the control relay to be a three pole design. Could this be changed to a 4 pole design?

A31. Yes. A 4 pole control relay is acceptable to CTA. The Detail Specification has been revised accordingly.

Q32. Appendix D, Section 2.03, Item A, Page D-31: This section requires the contacts to be rated at 16 amps. Could this be changed to 12 amps?

A32. Yes. Contacts rated at 12 amps are acceptable to CTA. The Detail Specification has been revised accordingly.

Q33. Appendix D, Section 2.03, Item A, Page D-31: The relay type currently referred to a Cutler Hammer type D3PF has been changed to a D7PF. Would CTA revise the specification to reflect the current part number?

A33. Yes. The Cutler Hammer type D7PF relay is acceptable to CTA. The Detail Specification has been revised accordingly.

Q34. Appendix D, Section 2.04, A, Page D-31: This section requires the wire to come with 750V type SIS insulation. Can this rating be changed to 600V?

A34. Yes. The wire is to come with 600 V type SIS insulation. The Detail Specification has been revised accordingly.

Q35. Will CTA be revising the drawings associated with this project?

A35. All the drawings have been revised and are attached.

Q36. Is Drawing # E-412 needed?

A36. No. Drawing # E-412 will be eliminated from this requirement. The Detail Specification has been revised accordingly.

Q37. Do you anticipate the bid opening date be extended as a result of this meeting?

A37. No. The bid opening date will remain at Friday, May 17, 2013.

END OF MINUTES

CHICAGO TRANSIT AUTHORITY

FURNISH ALL COMPONENTS REQUIRED TO PROVIDE
A COMPLETE POWER CONTROL SYSTEM THAT WILL DISTRIBUTE
POWER TO EXISTING STINGER EQUIPMENT LOCATED
AT CTA'S 98TH STREET RAIL SHOP FACILITY

REQUISITION NO. C13RI101382206
SPECIFICATION NO. CTA 2011-0074A

ADDENDUM NUMBER ONE (1)

THE FOLLOWING CHANGES SHALL BE INCORPORATED INTO THE CONTRACT BID DOCUMENT PREVIOUSLY MAILED:

DETAIL SPECIFICATION:

Please remove Detail Specification No. 2011-0074 in its entirety and replace the complete specification with new Detail Specification No. 2011-0074A, Revised 4/25/13 attached.

SPECIAL CONDITIONS

Please remove pages SC-1 through SC-6 and replace with new pages SC-1 through SC-6, Revised 4/26/13 attached.

PROPOSAL PAGE

Please remove the Proposal Page P-1 and replace with the new Proposal Page P-1, Revised 4/26/13 attached.

DRAWINGS

Please remove Drawings No. E-402; E-403; E-404; E-405; E-406; E-407; E-408; E-409; E-410; E-411 & E-412 and replace with new Drawings No. E-402; E-403; E-404; E-405; E-406; E-407; E-408; E-409; E-410; & E-411 revised 4/25/13 attached.

COVER PAGE

Please remove the Cover Page and replace with the new Cover Page, Revised 4/26/13.

END OF ADDENDUM

CHICAGO TRANSIT AUTHORITY ADDENDUM 1
Revised 4/25/13

DETAIL SPECIFICATION FOR 750 VOLT DC SWITCHBOARD AND CONTROLS FOR 98TH STREET RAIL SHOP Spec No: CTA 2011-0074A

1 SCOPE

1.1 This specification covers the requirements for a Contractor to furnish a complete Power Control System for the stinger system operation at CTA's 98th Street Rail Shop facility. No stinger tracks or trolleys are required to be provided. The Contractor is required to furnish completely assembled 750 volt dc switchboard assemblies and controls for the operation of the shop stinger system. The completely assembled switchboard system includes 750V DC test stations for connecting auxiliary power to the rail cars, all power controls, DC power manual disconnect switches, negative control panel and contactor assemblies, DC cutout panel in the foreman's office with all the associated controls, spare fuses, emergency pushbutton stations and warning devices. Installation of the equipment at CTA facility will be done by CTA personnel. This is to be a complete power control system that is able to function and operate as intended.

1.2 Related documents:

General requirements for the materials to be used, and methods to be followed while assembling the switchboards and controls can be seen in the following appendixes:

A. Appendix A: Wires, Cables, Splices, Terminations
B. Appendix B: DC Distribution Switchboard
C. Appendix C: DC Contactor
D. Appendix D: DC Control Relay Cabinet
E. Appendix E: 750 VDC Auxiliary Power Switch – Car Test Station

2. MATERIAL REQUIREMENTS

The Contractor shall furnish the equipment necessary for the Red Line 98th Street rail shop, including:

2.1 Ten (10) Switchboard cabinet (cubicle) assemblies are to be provided: 1000 amp 750 volt dc switchboard assemblies with molded safety yellow approx. ¼ inch thick fiberglass enclosures; viewing windows (except resistor enclosure); non-metallic screened vents with drip guards, 4x4 wire trough extended across bottom of enclosures for control interconnections; "sis" awg #12 control wiring (stranded copper 750 volt) with machine printed sleeve type wire markers at each termination point; all connections made with insulated ring lugs where possible; connections to devices with captive screws and relay sockets to be made with insulated locking fork terminals, terminal blocks screw type, 3 point 30 amp 750 volt.

2. MATERIAL REQUIREMENTS (Continued)

2.1 All bus 1000 amp/sqin silver plated copper (2 pieces ¼ x 2, sandwiched) assembled with silicon bronze hardware, full overlap joints and provided with approx. ¼ thick plastic barriers in contactor sections, safety door switches (expect cubicle 1), boxed channel base ASTM a 36 c3 x 4.1, assembly hardware extending between sections and hardware for mounting the enclosures to the channel base insulated with RTV silicon. The individual cubicles (cabinets) are to be configured as follows:

A. Cubicle (Cabinet # 1): 72 inch high x 30 inch wide x 24 deep ventilated enclosure with viewing window, containing:

Dc power supply: Acopian #W24GT50 or approved equal, 90-132 volt input, 24 volt dc output, 50 amp, 1200 watt.

Dc distribution panel: side feed 60 amp 2 pole main breaker, 2 pole 20 amp branch breakers (14 KAIC @ 125 volt dc)

4 pole double throw 24 volt dc control relays, octal style base, with LED indicating light, test feature, and hold down spring.

B. Cubicle (Cabinet # 2): 72 inch high x 24 inch wide x 24 deep ventilated enclosure with viewing window, right hinged doors and door switch, containing:

Top entrance 1 pole bolted pressure style main switch.

1000 amp 750 volt dc non fusible, hook stick operated with normally open auxiliary contact and key interlock (key interchanged with resistor cubicle so that main switch must be off before resistor cubicle can be opened). Cross bus to resistor cubicle.

C. Cubicle (Cabinet # 3): 72 inch x 36 inch wide x 24 deep ventilated enclosure with right hinged doors, door switch, door key interlocked with main switch so that main switch must be opened before resistor enclosure can be opened, containing:

Current limiting resistor assembly with (4) high current stainless steel continuous strip resistors 225 amp .1840 ohm.

(1) switchboard ammeter insulated case, approx. 4 ½ inch 50mv movement 0-1000 amp scale.

2. MATERIAL REQUIREMENTS (Continued)

C. Cubicle (Cabinet # 3) (Cont.):

(1) bus mounted 1000 amp, 50 mv dc shunt with 5 foot calibrated leads.

(1) bus mounted shawmut #a150x600-4 (or approved equal) 1000 volt 600 amp dc fuse.

(3) 24 volt dc exhaust fans, approx. 4.72 inch sq., 105 cfm, with sq. plastic finger guard.

(1) thermostat SPST 32°-140°f adjustable.

(1) replaceable fiberglass air intake filter.

Necessary bus work from main switch cubicle, resistor assembly, fuse mounting, ammeter shunt to top right hand side of enclosure for cable connections to contactor sections cross bus.

D. Cubicle (Cabinet # 4): Stinger track A contactor assembly; 72 inch high x 24 inch wide x 24 deep ventilated enclosure with viewing window and a door switch, containing:

1000 amp cross bus with barrier.

(1) Bus connected top entrance bolted pressure style switch, 400 amp 750 volt dc, fusible, hook stick operated with normally open auxiliary contact and Little Fuse isdr 200 fuse or approved equal.

(1) 1250 amp 1000 volt dc contactor with over current hold in 28 volt dc coil, 2 normally open 2 normally closed auxiliary contacts, coil arc suppressor, red led push to test light.

Riser bus for top cable exit with compression terminal.

E. Cubicle (Cabinet # 5): Test stations Track A contactor assembly; 72 inch high x 24 inch wide x 24 deep ventilated enclosure with viewing window and a door switch, containing:

1000 amp cross bus with barrier.

2. MATERIAL REQUIREMENTS (Continued)

E. Cubicle (Cabinet # 5) (Cont.):

(1) Bus connected top entrance bolted pressure style switch, 400 amp 750 volt dc, fusible, hook stick operated with normally open auxiliary contact and Little Fuse isdr 300 fuse or approved equal.

(1) 1250 amp 1000 volt dc contactor with over current hold in 28 volt dc coil, 2 normally open 2 normally closed auxiliary contacts, coil arc suppressor, red led push to test light.

Riser bus for top cable exit with compression terminal.

F. Cubicle (Cabinet # 6): Stinger Track B contactor assembly; 72 inch high x 24 inch wide x 24 deep ventilated enclosure with viewing window and a door switch, containing:

1000 amp cross bus with barrier.

(1) Bus connected top entrance bolted pressure style switch, 400 amp 750 volt dc, fusible, hook stick operated with normally open auxiliary contact and Little Fuse isdr 200 fuse or approved equal.

(1) 1250 amp 1000 volt dc contactor with over current hold in 28 volt dc coil, 2 normally open, 2 normally closed auxiliary contacts, coil arc suppressor, red led push to test light.

Riser bus for top cable exit with compression terminal.

G. Cubicle (Cabinet # 7): Test stations Track B contactor assembly; 72 inch high x 24 inch wide x 24 deep ventilated enclosure with viewing window and a door switch, containing:

1000 amp cross bus with barrier.

(1) Bus connected top entrance bolted pressure style switch, 400 amp 750 volt dc, fusible, hook stick operated with normally open auxiliary contact and Little Fuse isdr 300 fuse or approved equal.

(1) 1250 amp 1000 volt dc contactor with over current hold in 28 volt dc coil, 2 normally open 2 normally closed auxiliary contacts, coil arc suppressor, red led push to test light.

Riser bus for top cable exit with compression terminal.

2. MATERIAL REQUIREMENTS (Continued)

H. Cubicle (Cabinet # 8): Stinger Track C contactor assembly; 72 inch high x 24 inch wide x 24 deep ventilated enclosure with viewing window and a door switch, containing:

1000 amp cross bus with barrier.

(1) Bus connected top entrance bolted pressure style switch, 400 amp 750 volt dc, fusible, hook stick operated with normally open auxiliary contact and Little Fuse isdr 200 fuse or approved equal.

(1) 1250 amp 1000 volt dc contactor with over current hold in 28 volt dc coil, 2 normally open 2 normally closed auxiliary contacts, coil arc suppressor, red led push to test light.

Riser bus for top cable exit with compression terminal.

I. Cubicle (Cabinet #9): Test stations Track C - East contactor assembly; 72 inch high x 24 inch wide x 24 deep ventilated enclosure with viewing window and a door switch, containing:

1000 amp cross bus with barrier.

(1) Bus connected top entrance bolted pressure style switch, 400 amp 750 volt dc, fusible, hook stick operated with normally open auxiliary contact and Little Fuse isdr 300 fuse or approved equal.

(1) 1250 amp 1000 volt dc contactor with over current hold in 28 volt dc coil, 2 normally open 2 normally closed auxiliary contacts, coil arc suppressor, red led push to test light.

Riser bus for top cable exit with compression terminal.

J. Cubicle (Cabinet # 10): Test stations Track C-West contactor assembly; 72 inch high x 24 inch wide x 24 deep ventilated enclosure with viewing window and a door switch, containing:

1000 amp cross bus with barrier.

Bus connected top entrance bolted pressure style switch, 400 amp 750 volt dc, fusible, hook stick operated with normally open auxiliary contact and Little Fuse isdr 300 fuse or approved equal.

2. MATERIAL REQUIREMENTS (Continued)

J. Cubicle (Cabinet # 10) (Cont.):

1250 amp 1000 volt dc contactor with over current hold in 28 volt dc coil, 2 normally open 2 normally closed auxiliary contacts, coil arc suppressor, red led push to test light.

Riser bus for top cable exit with compression terminal.

2.2 One (1) DC cutout panel (foreman's office) is to be provided: To consist of an approx. 12 gauge galvanneal enclosure; continuously welded seams; hinged show box cover with continuous stainless steel hinge; gasketted with draw pull catches; galvanneal steel sub pan; enclosure primed and painted light gray ansi-61; sub pan primed and painted white.

Door mounted devices prewired to terminal blocks to consist of the following:
(All indicating lights are 24 volt dc led type push to test)

(1)	green light	"dc power cutout"
(1)	red light	"dc power on"
(1)	key operated two pos. Sel. Sw.	"dc power on off"
(1)	red mushroom. Push-pull	"emergency stop"
(1)	amber light	"neg. Return system fail"
(1)	red light	"neg. Return system on"
(1)	black pb	"neg. Return sys. Reset"
(1)	black pb	"neg. Return sys. Test"
(1)	black pb	"neg. Return alarm silence"
(1)	mallory sonalert buzzer	

Track stinger control indication (Track A, Track B, Track C)

(3)	green lights	"off"
(3)	red lights	"on"

Dc car test stations
(Track A, Track B, Track C-North, Track C- South)

(4)	green lights	"off"
(4)	red lights	"on"

2.3 Two (2) Negative Contactor Assemblies are to be provided: To consist of a yellow approximately .187 inches thick molded composite material enclosure with non-conductive back pan, hinged door with draw pull catches and door switch, containing:

2. MATERIAL REQUIREMENTS (Continued)

2.3 Two (2) Negative Contactor Assemblies (Continued):

A. (1) 1250 amp 1000 volt dc contactor with over current hold in 28 volt dc coil, 2 normally open, 2 normally closed auxiliary contacts, coil arc suppressor.

B. ¼ by 4 silver plated copper line lug detail with: (1) Anderson SWH-200-D 1500mcm cable lug (bronze straight bolt terminal cable to flat) or approved equal and (3) Panduit LCC500-12 2 hole long barrel lugs or approved equal.

C. ¼ by 4 silver plated copper load lug detail with: (3) Panduit LCC500-12-2 hole long barrel lugs or approved equal .

2.4 One (1) negative control panel is to be provided: To consist of a yellow approximately .125 inches thick molded laminate composite, hinged door with draw pull catches containing:

A. Total of two (2) 4-pole double throw 24 volt dc control delays: octal style base, with LED indicating light, test feature, and hold down spring.

B. Total of two (2) Plug in timers: on delay, 1 sec. Fixed time delay with sockets and hold down springs.

C. 30 amp 600 volt screw type terminal blocks.

2.5 Eight (8) DC Auxiliary power car test station assemblies are to be provided: Each test station is to include the following:

A. Bolt switch 200 amp 1 pole double break 750 volt dc fusible switch with 2 normally open 2 normally closed auxiliary contacts, yellow fiberglass enclosure and Little Fuse isdr-150 fuse or approved equal.

B. Red indicating lights, 24 volt dc LED type push to test mounted on a yellow molded composite enclosure.

2.6 Nine (9) Emergency Stop Pushbutton Stations are to be provided:

A. Mushroom head style: red; push-pull; maintained contact pushbuttons mounted on a yellow molded composite enclosure.

2. MATERIAL REQUIREMENTS (Continued)

2.7 Six (6) Warning Devices are to be provided:

A. Audio/visual warning devices: 24 volt dc; red flashing strobe light with warning horn and wall mounting bracket.

2.8 One (1) complete set of duplicate spare fuses for the switchboard assemblies and one (1) hook stick is to be provided.

3. DRAWING REQUIREMENTS:

3.1 Approval drawings and catalog cut sheets shall be provided within 4 weeks after the contract is awarded. Shop Drawings for approval shall consist of the following categories:

1. Fabrication, assembly and details.
2. Shop Drawing of all component parts.
3. Point to point interconnection wiring diagrams for field assembly and overall assembly.
4. One-line diagram.
5. Schematic diagram.
6. Bill of materials.
7. Bound manuals including parts lists.
8. Field assembly details for all shipping splits

3.2 Drawings shall be sent to the attention of the CTA Testing Engineer for approval prior to assembly of any equipment.

3.3 After the drawings are approved by authorized CTA personnel, all the switchboard assemblies shall be assembled and tested by the Contractor.

4. TESTING REQUIREMENTS

4.1 A professional engineer shall review all final connections and start-up at the site before switchgear is energized.

4.2 CTA personnel are required to be present at the Contractor's facilities to witness the full function testing of the equipment prior to shipment.

5. DELIVERY REQUIREMENTS

5.1 All the switchboard assemblies and control equipment required for the stinger power control system is to be shipped within 18 weeks after the drawings are approved by authorized CTA personnel.

6. APPROVED & NON-APPROVED ITEM INFORMATION

6.1 The Contractor shall only furnish and deliver CTA approved items under the terms of a given contract. Should a potential contractor wish to offer for CTA consideration an alternate item not currently approved, the potential contractor shall first contact the CTA Procurement Administrator or Buyer for details on the CTA's item approval process. The time required for reviewing and/or testing each item offered will vary and depend on applicable procedures. Approval of an item does not guarantee an order under a currently proposed or future contract. Upon award of a contract, each item furnished by the Contractor shall be identical to the item that was approved.

7. ADDITIONAL INFORMATION FOR POTENTIAL BIDDERS

7.1 Bidders requiring additional information shall contact the Procurement Administrator listed on the front page of this contract document. Potential bidders requiring additional information from person(s) listed in the special conditions must route their requests through the Procurement Administrator. Potential bidders who contact any CTA personnel other than the Procurement Administrator will be considered in violation of the provisions of the contract document.

DISTRIBUTION: Manager, Facilities Eng. Tech. Support,

APPENDIX A: WIRES CABLES, SPLICES, TERMINATIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

1.02 SUMMARY

A. This section specifies all wires, cables, splices and terminations as well as appurtenances thereto required under this Contract.

PART 2 PRODUCTS

2.01 GENERAL

A. The Drawings show the locations, type, size and number of wires and cables to be furnished under this Contract. Each type shall comply with the Specifications contained herein.

B. Only new cables shall be provided. Cables which have been manufactured more than two years prior to installation will not be accepted.

C. The conductors, unless otherwise noted, shall be soft or annealed copper conforming to ANSI/ASTM B 33 if coated, ANSI/ASTM B 3 if uncoated. In addition, unless otherwise specified, stranded conductors shall have concentric stranding as per ANSI/ASTM B 8.

D. Cables shall be supplied with both ends of each length sealed against the entry of moisture.

2.02 QUALITY ASSURANCE - AC CABLE

A. All wires and cables shall be listed by Underwriter's Laboratories, Inc. and shall be copper.

B. All wire and cable shall be stamped every two feet indicating, voltage, type, temperature rating, manufacturers name, etc., all in conformance with latest applicable standard.

C. All conductors for wire and cable shall be copper based on 98 percent conductivity according to Mattheisen's Standard.

APPENDIX A: WIRES CABLES, SPLICES, TERMINATIONS (Continued)

2.03 MATERIALS - AC WIRE AND CABLE

A. Wire number 10 AWG and smaller shall be solid, wire number 8 AWG and larger shall be stranded. Control wiring shall be stranded in all sizes and color coded, as approved by the Authority.

B. All wire Number 6 AWG and smaller, shall have color coded insulation. All wires Number 4 AWG and larger in each, pullbox, outlet, cabinet and every point where wires are accessible or visible, shall be color coded. The same color coding shall be used throughout the entire electrical system.

C. Color as selected for the purpose of identifying circuits shall be applied to the wire. The colors shall be fast, fadeless and capable of withstanding cleaning in the event that the wire becomes soiled.

1. Green shall be used only for ground wire.
2. All conductors shall be color coded as follows:

	240V/208V/120V AC	480/277V AC
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	White
Ground	Green	Green

D. All numerical references to wire size in the Specifications and on the Drawings refer to standard American Wire Gauge (AWG), or where so stated, thousands of circular mils (KCMIL).

E. The Contractor shall provide wire with thermoplastic insulation type "THWN/AWM." Wire insulation shall consist of a tough, elastic, flexible rubber-like synthetic insulation compound made from 105 degrees C polyvinyl chloride or, its copolymer with vinyl acetate, covered with a nylon jacket. It shall be highly resistant to oil and moisture and shall not be affected by acid or alkali conditions, and marked by UL label as "Gas and Oil Resistant II."

F. The insulation compound shall be suitable for operating without undue injury or deterioration; under conductor temperatures not exceeding 75 degrees C wet or dry, and 75 degrees C in oil UL rating; and shall be rated 750 volts.

APPENDIX A: WIRES CABLES, SPLICES, TERMINATIONS (Continued)

2.03 MATERIALS - AC WIRE AND CABLE (Cont.)

G. The thermoplastic insulation and nylon jacket shall be applied to the conductor in a manner that will provide continuous walls of uniform thickness, free from defects and of high dielectric strength.

H. Type "THWN/AWM" insulated wire and cable shall be manufactured and tested in accordance with the requirements of UL and the latest ASTM Specifications for insulated wire and cable, polyvinyl insulation compound and nylon jacket, and shall also comply with IPCEA Standard S-19-81.

2.04 MATERIAL - AERIAL AND UNDERGROUND CABLE, AC SERVICE

A. Aerial and underground cable shall be single conductor copper. Conductor insulation shall be XLP insulation/jacket, 750V type RHH-RHW-USE. All conductors shall have an overall jacket, resistant to ozone, sunlight and weather.

B. Cable shall be rated, for continuous full-load operation, 90 degrees C in dry locations or 75 degrees C in wet or dry locations.

2.05 MANUFACTURERS

A. AC Wire and cables shall be as manufactured by Pirelli, Okonite, Triangle Wire & Cable, or Rome, Product of Cyprus Wire, or Carol Cable - Division of Avnet, or approved equal.

2.06 CABLE SPLICING, TERMINATING AND ARC PROOFING MATERIALS

A. TERMINATIONS - AC WIRES AND CABLES:

1. Special care shall be taken to balance the loads on all phases, at all cabinets. The panelboard schedules show the proper circuiting, the Contractor shall not change this circuiting without the approval of the Engineer. Distinguishing colors shall be used for identifying the particular phase on which the circuit belongs.

2. 600 volt cable lugs for terminations to busbar, switch studs, and terminal blocks, for Number 22 AWG to 10 AWG wire shall be color coded nylon insulated ring tongue lugs in vibration areas, and spade type in other areas. They shall have a secondary metal sleeve around the wire barrel for insulation strain relief. Type shall be Panduit Pan-Term PN series terminals or CTA approved equal.

APPENDIX A: WIRES CABLES, SPLICES, TERMINATIONS (Continued)

2.06 CABLE SPLICING, TERMINATING AND ARC PROOFING MATERIALS (Cont.)

3. Termination for Number 8 AWG to 1/0 AWG wire shall be with standard barrel one hole high conductivity seamless copper lugs with inspection holes to assure adequate wire insertion. The tongue shall be stamped with wire size, UL & CSA logos and manufacturer. The base part number and stud size should also be stamped on the tongue to assure adequate identification in application. Barrels shall contain color coded rings, die color code and/or number. Crimp locations shall be indicated to assure correct installation. For further identification, the manufacturer should also be included on the barrel. Type shall be Panduit Series LCB or LCC Power Connectors or Burndy Type YA, or approved equal.

4. Number 2/0 AWG and larger wire shall be terminated with long barrel, two hole high conductivity seamless copper lugs. Barrels shall contain color coded rings knurled markings indicating die color code, die index numbers, and crimp locations to assure correct usage and installation. For further identification, the manufacturer should also be included on the barrel. For Number 2/0 to 250 MCM sizes, the tongue may be stamped with wire size, UL & CSA logos and manufacturer. The base part number and stud size should also be stamped on the tongue to assure adequate identification in application. Type shall be Panduit LCC series Power Connectors or Burndy Type YA, or approved equal.

B. SPLICES - AC WIRES AND CABLES:

1. Number 10 AWG and smaller wire shall be spliced with insulated butt connectors. Connectors shall contain a center wire stop for adequate wire insertion, translucent nylon insulated housings to insure accurate crimp location, and brazed seam construction for high performance terminations. Type shall be Panduit BSN Pan-Term Butt Splices or 3M "Scotch Lock" or CTA approved equal.

2. Number 8 AWG and larger wire shall be standard barrel, high conductivity seamless copper splices. Barrels shall contain color coded rings knurled markings indicating die color code, die index numbers, and crimp location to assure correct usage and installation. For further identification, the base number and manufacturer should also be included on the barrel. Type shall be Panduit SCS series Power Connectors or 3M "Scotch Lock" or CTA approved equal.

APPENDIX A: WIRES CABLES, SPLICES, TERMINATIONS (Continued)

B. SPLICES - AC WIRES AND CABLES (Cont.):

3. Number 10 AWG and smaller wire taps for solid wires shall utilize insulated compression type twist wing or nut style connectors with 105 degrees C, 600 volt rating, for UL listed wire combinations. Connectors shall have a tough nylon housing with a deep skirt to prevent shorts and flashovers, funnel entry to facilitate wire insertion, expanding square wire spring design to ensure reusability, as well as markings to indicate part number UL & CSA logos, and wire range. Nut Style connectors shall be of industry nut style color coding; Blue, Orange, Yellow, and Red (small to large) with comfortable ribs for greater gripping. Industry standard Wing Style color coding shall also be used; Yellow, Red, Blue (small to large), with offset wings to ensure comfort and torquing capability. In addition, black connectors may be used for temperature applications to 150 degrees C and green connectors for grounding applications. Type shall be Panduit "P-Conn" Wire Connectors or 3M "Scotch Lock" or CTA approved equal.

4. Number 10 AWG stranded and smaller, taps shall be made with insulated compression type wire joints. Type shall be Panduit Type JN or approved equal.

5. Number 8 AWG and larger wire taps for stranded wire shall utilize compression taps up through 4/0 AWG wire or parallel gutter taps for larger wire. Taps shall have part number and wire range indicated on the body of the connector. Type shall be Panduit C-Tap Power Connectors or OZ Electrical Type XTP parallel gutter taps or CTA approved equal.

PART 3 EXECUTION

3.01 INSTALLATION - AC WIRES AND CABLES

A. Wires and cables shall be carefully handled during installation. Joints and splices shall be made in an approved manner, and shall be equivalent electrically and mechanically to the conductor itself.

B. Conduit fill shall be based on Chicago Electric Code for "New Work."

C. All branch circuit and control wiring, in conduit shall be not less than Number 12 AWG wire unless noted otherwise.

APPENDIX A: WIRES CABLES, SPLICES, TERMINATIONS (Continued)

3.01 INSTALLATION - AC WIRES AND CABLES (Cont.):

D. Stranded control cables in Number 12 AWG size and smaller shall be terminated into solderless lugs, then lug shall be connected to terminal part.

E. At least six inch loops or ends shall be left at each outlet for the installation of fixtures or devices.

F. All wires in outlet boxes not for the connection to fixtures, devices or other wires at that outlet, shall be rolled up and the ends capped or taped.

G. All circuits in panelboards shall be neatly grouped and tied with seine twine, or nylon wire ties.

H. No splice or any kind shall be pulled into any raceway. All splices and taps shall be accomplished in a manhole, handhole, junction, pullbox or other accessible enclosure.

3.02 WIRE PULLING LUBRICANT

A. When necessary to use a lubricant for pulling wires in steel conduit, lubricant shall be UL listed and be of such consistency that it will leave no obstruction or tackiness that will prevent pulling out old wires or pulling in new or additional wires. No soap flakes or vegetable soaps shall be permitted.

3.03 TESTING

A. Wires and Cables:

1. After wires and cables are in place and connected to devices and equipment, the system shall be tested for shorts and grounds.

2. All hot wires, if shorted or grounded, shall be completely removed and replaced in kind.

3. A voltage test shall be made at the last outlet on each circuit. If the drop in potential is greater than permitted by the CEC, the Contractor shall correct the condition by removing and replacing partly grounded connections or reconnecting high resistance splice.

4. All grounds, shorts and high resistance splices shall be remedied immediately at the conclusion of testing for acceptance.

APPENDIX A: WIRES CABLES, SPLICES, TERMINATIONS (Continued)

3.03 TESTING (Cont.)

B. Wires and Cables (Cont.):

5. Any wiring device, or electrical apparatus provided under this Contract, if grounded or shorted shall be removed, trouble corrected and reinstalled.

6. All high voltage cables, after in place and connected, shall be megged, in presence of the Authority.

7. All meters, cable connections, equipment or apparatus necessary for making all tests shall be furnished by the Contractor at Contractor's own expense. The Contractor shall provide copy of all tests for Authority's approval of result.

8. No work shall be covered up without approval of the Authority.

3.04 IDENTIFICATION OF WIRES AND CABLES

A. General:

1. All wires and cables, shall be identified by circuits in all cabinets, boxes, manholes, hand-holes, wiring troughs and other enclosures, at all terminal points.

2. The circuit designations shall be as shown on the Drawings, or as directed by the Authority. Tags shall be attached to wires and cables so that they will be readily visible.

B. Cable/wire markers shall be installed on both ends of all conductors, both for internal and external cables.

END OF SECTION

APPENDIX B: DC DISTRIBUTION SWITCHBOARD

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Work under this Section is subject to requirement of the Contract Documents, including the General Conditions, The Special Conditions, Requirements for Bidding and Instructions to Bidders of these Specifications.

B. Description of Work:

1. Provide 750 VDC distribution switchboard as follows:

a. Switchboard design shall be completely engineered by assembler to implement CTA intention in accordance with contract drawings.

b. Switchboard shall be completely assembled and tested at the assembler's facility prior to shipment.

1.02 QUALITY ASSURANCE

A. CTA Engineer shall be allowed to witness complete factory test of assembled switchboard, including DC Hypot, and shall receive a copy of all tests performed.

B. Source Quality Control

1. Design Tests Provided by Switch Board Assembler, including all incidental expenses:

a. Rated continuous current test.

b. Enclosure test per NEMA ICS-6.

c. Dielectric test.

d. Functional control test.

APPENDIX B: DC DISTRIBUTION SWITCHBOARD (Continued)

B. Source Quality Control (Cont.)

2. Production Tests:

a. Perform tests on completed switchboard assembly, and provide copy of all tests performed to CTA Engineer.

b. Type:

1. Mechanical operation test.

2. Control wiring tests.

3. Electrical operation tests.

C. This Specification states those operating, maintenance, safety features and quality of equipment required by CTA.

D. Sole responsibility for Engineering and design of switchboard, correct and proper application of equipment desired, shall be that of the switchboard assembler engineering staff.

E. This Specification lists CTA equipment requirements. However, proper assembly is the complete and total responsibility of the switchboard manufacturer.

1.03 SUBMITTALS

A. Shop Drawings for approval shall be provided and shall consist of the following categories:

1. Fabrication, assembly and details.

2. Shop Drawing of all component parts.

3. Point to point interconnection wiring diagrams for field assembly and overall assembly.

APPENDIX B: DC DISTRIBUTION SWITCHBOARD (Continued)

1.03 SUBMITTALS (Cont.)

A. Shop Drawings for approval shall be provided and shall consist of the following categories: (Cont.)

4. One-line diagram.

5. Schematic diagram.

6. Bill of materials.

7. Bound manuals including parts lists.

8. Field assembly details for all shipping splits.

PART 2 PRODUCTS

2.01 MATERIALS

A. Switchboard General Descriptions:

1. Switchboard shall consist of an assembly of individual cubicles in a single line to contain all switching, interruption, limiting, control and metering devices required to receive, control and distribute 750 volt DC power and control to the stinger and car auxiliary test outlets.

2. Switchboard shall not exceed overall length as shown on Drawings. Individual cubicles for the same service shall be the same dimension and shall be designed for top or bottom entry of non-metallic (FRE type as specified in the Specification) conduits with bushed terminations.

3. Switchboard must have provision for continuous horizontal power bus and control bus with seals between each cubicle. Each cubicle shall have an individual control power terminal board. Any necessary control power interconnecting wiring shall be identified and installed by the switchboard manufacture.

4. Switchboard shall include resistors, disconnect, switches, contactors, current limiting fuses, busses, control circuits, protective devices, relays, timers, indicating meters, terminal blocks, over current protective devices and all wiring and connections to comprise a complete and operable switchboard assembly.

5. Switchboard shall be rated for available DC short circuit amperes.

APPENDIX B: DC DISTRIBUTION SWITCHBOARD (Continued)

2.01 MATERIALS (Cont.)

A. Switchboard General Descriptions: (Cont.)

6. Switchboard shall be arranged for top or bottom entrance of all incoming power circuits as indicated on Drawings.

7. Switchboard assembler and enclosure manufacturer shall coordinate equipment mounting requirements, per cubicle, such that accurately located equipment mounting studs shall be provided. Equipment mounting studs shall penetrate the plywood and inner wall surface, and not be visible on back/outside surface. All metal studs shall be covered with fiberglass on outside of enclosure. The fiberglass covering shall have its thickness equal to or greater than the structure enclosure thickness. Equipment mounting stud sizes, correct mounting/attachment method shall be provided by manufacturer of device, and recommended torque shall be included. Field drilling for device mounting shall not be permitted.

B. Enclosure:

1. Cubicles must be capable of free standing.

2. Cubicles must support the weight of all equipment required to be mounted therein.

3. Cubicles must resist without significant damage any abuse likely in the shipping, storage, installation or use.

4. Cubicles must be capable of being attached together in a rigid switchboard assembly.

5. Cubicles must be fire-resistant, rodent-proof and drip resistant.

6. Cubicles must be fabricated from reinforced fiberglass. Cubicles shall be non-conductive.

APPENDIX B: DC DISTRIBUTION SWITCHBOARD (Continued)

B. Enclosure: (Cont.)

7. Each cubicle shall be front accessible by means of a hinged door. Each door shall have a continuous stainless steel piano hinge. Hinge shall be mounted to the outside of the enclosure with any mounting hardware extending to the inside of the enclosure insulated with RTV silicon on the inside of the enclosure. Door shall be held in closed position utilizing a three (3) point latching mechanism. Door operating handle shall be insulated from the inside of the enclosure and supplied with nonconductive latch rods. Each door, except for the resistor assembly, shall have a safety window, polycarbonate type, for inspection of contents therein. Window shall be held securely in place without use of metal or metallic frame and fasteners. Each door shall have non-metallic screened ventilating openings with drip guard. Each door shall have an auxiliary electrical interlock switch as per Contract drawings.

C. Main DC positive power bus shall be solid copper, and shall have high grade insulating barriers. Bus shall have a current density of 1000 amperes per square inch, entire bus shall be silver plated in its entirety, after fabrication, prior to bolting together, as shall all splice plates. All bus assembly and mounting hardware shall be silicon bronze.

D. Meters shall be panel mounted, switchboard style, four and one-half (4-1/2) inch square, 250 degree linear scale, insulated case as manufactured by Tyco-Crompton or CTA approved equal. Shunts as required and calibrated leads shall be provided. All wiring for use with meters shall have insulation rated for 600V. Meters shall have panel gaskets, be dust tight and conform to ANSI C 12.

E. Main distribution switch as shall be to carry rated 1000 amp, 750 VDC. Switches shall be single pole, single throw with bolted pressure at both hinge and jaw contact areas, and have one (1) auxiliary electrical interlock contact normally open. Switch shall be designed for disconnect duty and shall be arranged for hook stick operation after opening door to obtain access to pull ring. It shall be capable of interrupting 750 VDC, 100 Amperes under load and cable of disconnection of 750 VDC circuits under no load. The auxiliary switch shall open before the main. Switch shall be provided with provision for key interlock to lock switch in the open position.

APPENDIX B: DC DISTRIBUTION SWITCHBOARD (Continued)

F. Feeder circuit switches shall be rated at 750 VDC. Switch shall be single pole, single throw with bolted pressure at both hinge and jaw contact area. Switch shall be designed for disconnect duty and shall be arranged for hook stick operation, after opening door, to obtain access to pull ring, and be provided with provision for padlocking open. Switches shall be capable of disconnections of 750 VDC volt circuits under no-load. Auxiliary switches shall open before main contacts.

G. Fused switches shall have tested ability to carry rated current continuous without exceeding 50 degree Celsius rise over 40 degree Celsius ambient documented with copy filed with CTA, and dielectric withstand of 2500 VDC for one minute as measured from switch to mounting base and across switch contacts, also documented and filed with CTA. Switches shall have tested ability to also withstand 20,000 amps DC for two (2) seconds.

H. Provide fuses as required for all the foregoing switches and having ampere rating as stated on Drawing. Fuses shall be clearly and unmistakably labeled with DC voltage and current rating.

Documentation stating fuse suitability for application indicated on Drawings and stated herein shall be provided for approval prior to purchase. No fuse shall be installed prior to full approval by Engineer.

I. Contactor shall conform to following:

1. Power circuit insulting details shall be molded from glass polyester materials having high arc and tracking resisting qualities. Arcing and creepage distances shall meet, or exceed, established NEMA Standards for 1 KV rated equipment. Insulation between main circuit details and operating coil shall be rated 3 KV DC minimum. Contactor shall be provided with permanent magnet blowout coils.

2. Arc chute vents shall from front of contactor, to eliminate requirement for arcing clearance above contactor. Arc chutes, contacts, operating coil and auxiliary contacts shall be so arranged for ease of front removal without disturbing line or load connections.

3. The Contactors for power outlets and traction power system shall be single pole, single throw, naturally cooled air break type shall be suitable for installation within the switchboard modules.

APPENDIX B: DC DISTRIBUTION SWITCHBOARD (Continued)

I. Contactor shall conform to following: (Cont.)

4. Each electrically operated contactor shall include an arc chute and overcurrent latch mechanism to prevent opening under overload currents. Each contactor shall be provided with one normally open and one normally closed electrically separate auxiliary electrical interlock contacts. Operating coil voltage shall be 24 volts DC. An opening in the enclosure for venting of ionized gases, shall be located as to avoid exposure to personnel, or other equipment. Contactors shall be of unit construction and assembled on a molded insulating base.

5. Contactor shall be provided with overcurrent hold-in protection features. The overcurrent hold-in protection shall energize a magnetic hold-in circuit from high line currents and shall prevent main contacts from opening above 2000 amps even with main operating coil de-energized. Reduction of highline current shall then permit contactor to interrupt current within published rating.

6. Contactor shall be provided with mechanical interlock preventing closing of main contacts when arc chute is not correctly in place.

7. Contactor operating coil shall be rated for continuous duty and shall operate correctly for operating voltage between 50% and 110% of nominal. Operating control voltage shall be 24 volt DC. Contactor coil to be provided with matching surge suppressor.

J. Each door shall be provided with electrical interlocks, and upon opening door shall de-energize the control circuit of the associated contactor. Opening the door of the main switch shall de-energize the control for all contactors, thus providing a no-load break for main switch. Provide key operated mechanical interlock on outer doors of main switch and resistor bank. Interlock shall require opening main switch door first.

K. Control voltage power supply shall provide 24 volt DC regulated and filtered, input voltage 115 VAC, 60 Hz single phase. Power supply shall be modular type, have 0. % ripple output, include a constant voltage transformer and be provided with short circuit protection.

L. Control voltage power supply shall have a fixed regulated DC output. The power supply shall integrally hold its output voltage of $\pm$ 1 % or less for source variations as great as $\pm$ 15% of the nominal input voltage. Response time for line voltage excursions within rated limits, shall be within 25 milliseconds. Power supply shall be rated 50 Amp 1200 watts.

APPENDIX B: DC DISTRIBUTION SWITCHBOARD (Continued)

M. Control relay shall be four pole, double throw,24V DC and octal style base with LED indicating light, test feature, matching socket with screw clamping terminals and hold down spring. Contacts shall be rated at 12amps 28VDC resistive, 1/3HP at 120VAC, pilot duty class B300.Relay shall be Eaton Cutler-Hammer type D7PF or Square D type RPM. Timing relays shall be general purpose plug in Square D type JCK with matching socket with screw clamping terminals and hold down spring.

N. Provide resistors consisting of uniform cross sectional grids mounted in unit boxes suitable for stacking within the switchboard enclosure as shown on the Drawings. Provide total equivalent resistance of 0.05 ohms. Resistor units shall be mounted on individual insulators for shock and vibration to permit dissipation of heat by normal convection. All ventilation openings shall have corrosion-resistant bug screening.

O. Provide Standard "C" channel, size C4 x 7.25 for front and rear length dimension of Switchboard as shown on Drawings.

P. Provide a disconnect stick for operating fused disconnect switches. Pole section shall be made of epoxy glass and be fitted with a NEMA Standard head having correct configuration for service intended.

Q. All the shipping splits shall follow the contract drawings and site restrictions.

R. No switch shall be so wired such that "blades" remain energized in the open position, nor mounted in such a way that the "blades" operate in the horizontal plane, or with the hinge at the top of the switch.

S. Provide the switchboard, rubber matting ribbed type with dielectric rating of 40,000 volts, DC and certified as tested and passed, under requirements of ASTM regulations to ensure personnel safety against 8000 volts to ground. Mat shall be continuous length, black color, minimum 1/4-inch thick, minimum three foot (3') wide and extend the full length of entire switchboard. Mat shall cover the full depth of working space.

APPENDIX B: DC DISTRIBUTION SWITCHBOARD (Continued)

2.02 MANUFACTURER

A. Switchboard assembler shall meet or exceed the following minimum criteria, in addition to compliance with established industry standards.

1. Switchboard assembler shall possess the capability to fully engineer new switchboard designs similar in application to CTA's herein proposed installation. This can be established by their history, or the relevant qualifications of their firm. Designer, or person in responsible charge of design must be registered as a professional engineer in the State of Illinois.

2. Switchboard assembler shall possess the manufacturing skills, the physical plant facilities and people necessary to execute the designs in a timely fashions, and at an acceptable level of quality.

3. Switchboard assembler shall have a stable and well funded operation that will be capable of standing behind the equipment for a period of five (5) years after it is installed and operating.

B. Contactors shall be manufactured by Hubble type 700 with coil arc suppressor or Engineer pre-bid approval equal. Absence of letter on file approving equal, shall without exception, indicate material shall be provided exactly as specified.

C. Key operated mechanical interlock shall be for the application as shown on the contract drawings as manufactured by Kirk key interlock co. or CTA approved equal.

D. Switchboard enclosure shall be fabricated by Signature, Stahlin, or Hoffman Enclosures Inc. or CTA approved equal.

E. Switchboard assembly shall be assembled by Illinois Switchboard Corporation, Gus Berthold Electric Co., or CTA approved equal.

F. Control voltage power supply shall be as manufactured by Acopian or CTA approved equal.

G. Disconnect stick shall be as manufactured by A. B. Change, or Joslyn or CTA approved equal.

APPENDIX B: DC DISTRIBUTION SWITCHBOARD (Continued)

H. Resistors shall be high current stainless steel continuous strip 225amp .1840ohm as manufactured by Filnor or CTA approved equal.

I. Channel base shall be a welded assembly fabricated from ASTM A36 structural steel channel C34.1 primed, finished safety yellow and undercoated.

J. Fuses shall be manufactured by Mersen type "A150X, or Littlefuse type ISDR as specified or CTA approved equal. Fuse types cannot be substituted.

K. Bolted pressure disconnect switch shall be as manufactured by Filnor or CTA approved equal.

END OF SECTION

APPENDIX C: DC CONTACTOR

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Work under this Section is subject to requirement of the Contract Documents, including the General Conditions, the Special Conditions, Requirements for Bidding and Instructions to Bidders of these Specifications.

1.02 DESCRIPTION OF WORK

A. Provide electrically operated DC Contactors for the DC Switchboard and negative power cabinets where and as shown on Drawings, and as herein specified.

1.03 QUALITY ASSURANCE

A. Contactors shall meet, or exceed, established NEMA Standards for 1 KV rated equipment.

PART 2 PRODUCTS

2.01 MATERIALS

A. Contactors shall conform to the following:

1. Power circuit insulating details shall be molded from glass polyester materials having high arc and tracking resisting qualities. Arcing and creepage distances shall meet, or exceed, established NEMA Standards for 1 KV rated equipment. Insulation between main circuit details and operating coil shall be rated 3KV DC minimum. Contactor shall be provided with permanent magnet blowout coils.

2. Arc chute vents shall vent from front of contactor, to eliminate requirement for arching clearance above contactor. Arc chutes, contactor, operating coil and auxiliary contacts shall be so arranged for ease of front removal without disturbing line or load connections.

APPENDIX C: DC CONTACTOR (Continued)

2.01 MATERIALS (Cont.)

A. Contactors shall conform to the following: (Cont.)

3. The contactors shall be single pole, single throw, naturally cooled air break type shall be suitable for installation within the specified enclosure.

4. Each electrically operated contactor shall include an arc chute and a overcurrent latch mechanism to prevent opening under overload currents. Operating coil voltage shall be 24 volts DC. An opening for venting of ionized gases, shall be located as to avoid exposure of personnel, or other equipment to any hazard. Contactors shall be of unit construction and assembled on molded insulating base.

5. Contactor shall be provided with mechanical interlock preventing closing of main contacts when arc chute is not correctly in place.

6. Contactor operating coil shall be rated for continuous duty, and shall operate correctly with operating voltage between 80% to 110% of rated operating coil voltage. Operating control voltage shall be 24 volt DC. Contactor coil to be provided with matching surge suppressor.

7. Auxiliary electrical interlock contacts shall be provided with contactors, of the type and quantity as required and shown on the Drawings.

B. Provide wall mounted enclosure approx. 0.187 inch thick non-conductive laminate composite with hinged door safety yellow exterior, white interior, white non-conductive back pan. Door provided with continuous stainless steel hinge (left side) and padlockable draw pull catches (right side). Hinge and catch hardware extending into the inside of the enclosure to be insulated with RTV silicon on the inside of the enclosure. Provide door interlock switch single pole, single throw normally open, held closed when cabinet door is closed. Enclosure to be rated NEMA 4X.

Negative power contactors to be provided with ¼ X 4 silver plated copper terminal adapters to terminate conductors as shown on the drawings. Terminal lugs to be 2 hole long barrel copper compression Panduit type LCC (or equal) for 500 MCM cable or Anderson mechanical type SWH (or equal), bronze straight bolt terminal cable to flat 500-2000 MCM.

APPENDIX C: DC CONTACTOR (Continued)

2.02 MANUFACTURER

A. Contactors shall be manufactured by Hubble type 700 with coil arc suppressor or Engineer pre-bid approval equal. Absence of letter on file approving equal, shall without exception, indicate material shall be provided exactly as specified.

B. Assembler shall possess the capability to fully engineer new switchboard designs similar in application to CTA's herein proposed installation. This can be established by their history, or the relevant qualifications of their firm. Person in responsible charge of design and assembly must be registered as a professional engineer in the State of Illinois. Assembler shall possess the manufacturing skills, the physical plant facilities and people necessary to execute the designs in a timely fashion, and at an acceptable level of quality. Assembler shall have a stable and well-funded operation that will be capable of standing behind the equipment for a period of five (5) years after it is installed and operating.

END OF SECTION

APPENDIX D: DC CONTROL RELAY CABINET

PART 1 GENERAL

1.01 SUMMARY

A. The work required in this Section specifies the requirements for the furnishing of all materials, tools, labor and equipment necessary and incidental to the installation of all wires, cable terminations as well as appurtenances thereto as shown and noted on the Drawings and as indicated herein.

B. Section Includes:

1. This Section specifies the DC Control Relay Panel and appurtenances for control and alarm wiring associated with the 750VDC Stinger System, 750 Volt DC Test Car Station Power and DC Negative Power Contactors, as specified elsewhere in these Specifications, and shown on the Drawings.

PART 2 PRODUCTS

2.01 RELAY CABINET

A. Not used

2.02 TERMINAL BLOCKS

A. Terminal shall be screw type, rated at 600V, 30 ampere, accepting a wire range from #22 AWG to #10 AWG.

B. Terminal block material shall be high density nylon with a temperature range of -30 degrees Celsius to 100 degrees Centigrade.

C. Provide mounting rails or channels within the enclosure to facilitate mounting the terminal blocks.

APPENDIX D: DC CONTROL RELAY CABINET (Continued)

2.02 TERMINAL BLOCKS (Cont.)

D. Terminal blocks shall be UL listed.

E. Manufacturers: Bussman, Cutler hammer, Square D, Allen Bradley, or CTA approved equal.

F. Terminal blocks shall be mounted on rails to the sub-panel inside the terminal cabinet.

G. The terminal blocks shall be completely assembled on mounting type channels with end pieces, and secured by stainless steel screws and nuts.

H. Not less than 20 percent spare terminal points shall be provided.

2.03 RELAYS

A. Control relays shall be 4 pole double throw, 24 volt dc, and octal style base with led indicating light, test feature, matching socket with screw clamping terminals and hold down spring. Contacts shall be rated at 12 amp @28 volt dc resistive, 1/3 H.P. @ 120 volt ac, pilot duty class B300. Relays shall be Eaton Cutler-Hammer type D7PF or Square D type RPM, or CTA approved equal.

B. Timing relays shall be general purpose plug in Square D type JCK or CTA approved equal, with matching socket with screw clamping terminals and hold down spring

C. Not less than 10 percent (minimum one) spare relays and timers to be provided mounted within the enclosure.

2.04 WIRE

A. Interconnection panel wire shall be #12 AWG, 1/c stranded copper, with 600 volt type SIS insulation.

2.05 WIRING DUCT

A. Wiring duct shall be open slot type with snap-on cover, all plastic construction, 4-inch by 4-inch or 3 inch by 3 inch properly sized per wire fill requirements.

B. Body and cover shall be made of rigid PVC, white or light gray color.

APPENDIX D: DC CONTROL RELAY CABINET (Continued)

2.05 WIRING DUCT (Cont.):

C. Must be UL component recognized and/or CSA certified and meet flammability rating UL 94-V-O.

2.06 NAMEPLATES

A. Relays and timers to be identified with engraved nameplates 1 inch by 2 inch white with black ¼ inch letters mounted to wire duct cover or back pan above relay with stainless steel hardware.

2.07 MANUFACTURER

Assembler shall possess the capability to fully engineer new relay cabinet designs similar in application to CTA's herein proposed installation. This can be established by their history, or the relevant qualifications of their firm. Person in responsible charge of design and assembly must be registered as a professional engineer in the State of Illinois. Assembler shall possess the manufacturing skills, the physical plant facilities and people necessary to execute the designs in a timely fashion, and at an acceptable level of quality. Assembler shall have a stable and well-funded operation that will be capable of standing behind the equipment for a period of five (5) years after it is installed and operating.

END OF SECTION

APPENDIX E: 750 VDC AUXILIARY POWER SWITCH – CAR TEST STATION

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Work under this Section is subject to requirement of the Contract Documents, including the General Conditions, the Special Conditions, Requirements for Bidding and Instructions to Bidders of these Specifications.

2. This Section specifies requirements for the furnishing 750 VDC Auxiliary Power Switch – Car Test Stations.

3. The components include, but are not limited to, a NEMA 4X fiberglass enclosure, 750 VDC disconnect switch, fuse, control pilot light, and associated parts as shown on the drawings.

1.02 QUALITY ASSURANCE

A. All devices, wire and fittings shall be UL Listed, and bear the label of the Underwriters Laboratories.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide enclosure for power switch which shall be fabricated of corrosion-resistant, dense, high impact strength, fiberglass reinforced polyester formula, all conforming to NEMA 1CVS-6 Type 4X enclosure requirements, including exterior mounts, top and bottom.

B. The disconnect switch shall be a two-pole, single throw "quick-make/quick-break" bolted pressure type, rated for 750 Volt DC service, ampere rating as shown on drawings. A cartridge type fuse, ampere rating as shown on drawings, shall be provided electrically between (in series) with the power poles. Switch terminals shall be capable of terminating cable size as shown on drawings. All other wiring shall be copper, non-shielded, with 2KV insulation. Provide auxiliary electrical interlock, two-pole, single throw contacts, mechanically operated with main power switch.

APPENDIX E: 750 VDC AUXILIARY POWER SWITCH – CAR TEST STATION (Cont.)

C. Door shall have continuous hinge, and contain a gasketed safety Lexan window so placed to allow unobstructed view of main power contacts. Doors shall be mechanically interlocked with switch handle, requiring handle to be in the "OFF" position for opening and closing. Enclosure exterior color shall be solid "safety" yellow.

D. Provide indicating light, NEMA 1CS-6 Type 4X, NEMA1CS-2, on top of switch enclosure, connected as shown on drawings. Indicating lamp shall be 24 volts DC, full-size LED type, heavy duty, and have a red lens.

E. Provide fiberglass support channels for switch mountings.

2.02 MANUFACTURERS

A. The 750VDC Auxiliary Power Switch, and enclosure shall be as manufactured by, Boltswitch Inc., Normandy Machine C. (Powerswitch), or CTA approved equal.

B. Fiberglass channel support shall be 1-5/8-inch by 1-5/8-inch as manufactured by B-Line Systems type B-22, Unistrut Corp., Type P 1000, or CTA approved equal.

C. Indicating light assembly shall be as manufactured by Cutler Hammer, Square D, Allen Bradley or CTA approved equal.

END OF SECTION

FURNISH ALL COMPONENTS REQUIRED TO PROVIDE A COMPLETE POWER CONTROL SYSTEM THAT WILL DISTRIBUTE POWER TO EXISITING STINGER EQUIPMENT LOCATED AT CTA'S 98TH STREET RAIL SHOP FACILITY

REQUISITION NO.: C13RI101382206

SPECIFICATION NO.: CTA 2011-0074A

DRAWING NO.: E-402; E-403; E-404; E-405; E-406; E-407; E-408; E-409; E-410; & E-411

PROJECT NO.: 68453

INSURANCE REQUIRED: None

BID DEPOSIT AMOUNT: None Required

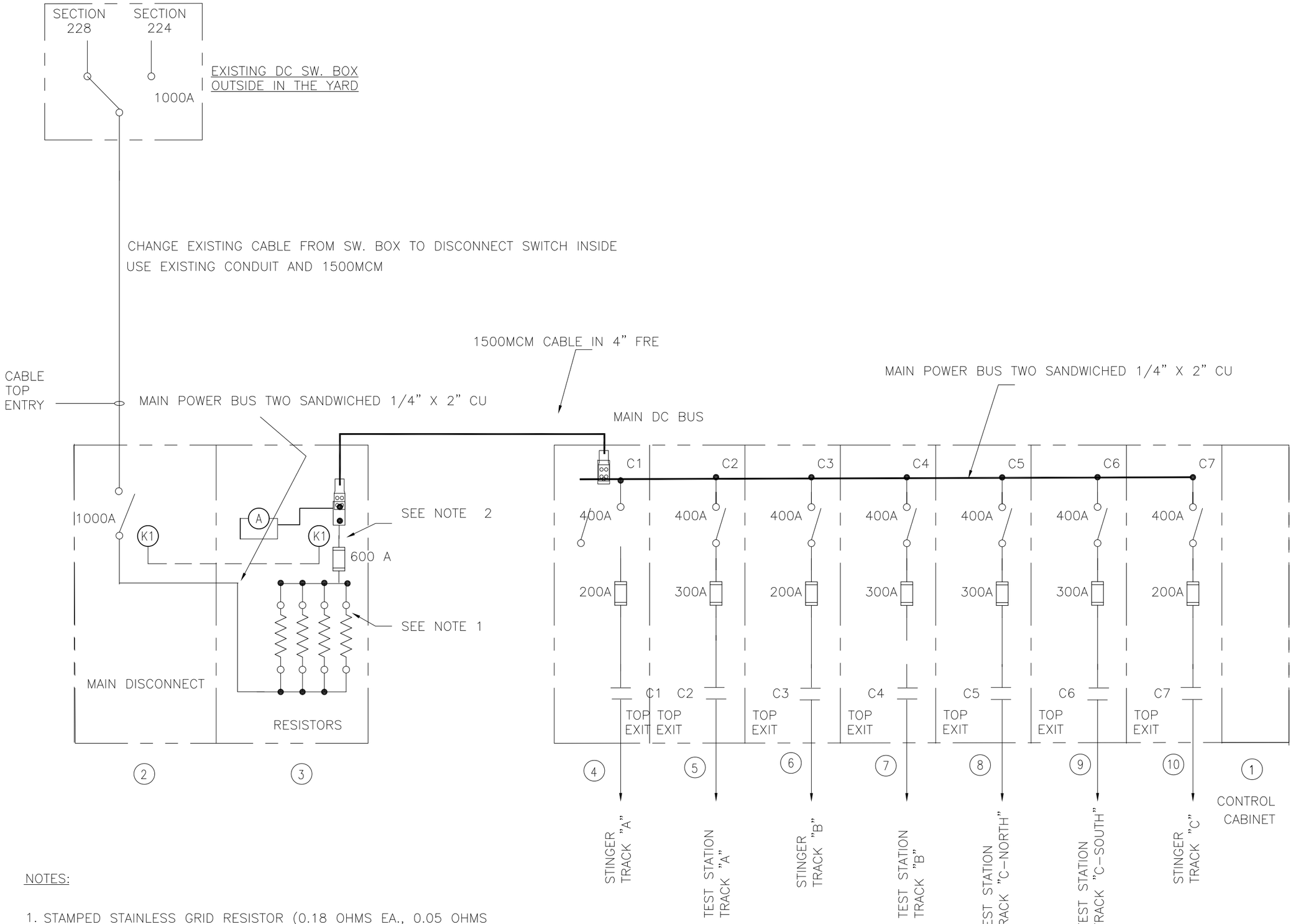
INFORMATION:
Sr. Procurement Administrator: Greta Harris
Phone Number: (312) 681-2463

BID PACKAGES TO BE RETURNED TO:

By Mail, In Person Drop-off or Delivery Service
Chicago Transit Authority
Bid Office - 2nd Floor
567 W. Lake Street
Chicago, IL 60661-1465

All Signatures to be sworn before a Notary Public

ISSUED BY
Purchasing Department
Chicago Transit Authority
567 W. Lake Street, Chicago IL 60661-1465
Ellen McCormack, Vice President, Purchasing & Warehousing
Forrest Claypool, President
Terry Peterson, Chairman
(REVISED 4/26/13)



NOTES:

1. STAMPED STAINLESS GRID RESISTOR (0.18 OHMS EA., 0.05 OHMS RESISTANCE TOTAL).
2. DOORS FOR RESISTOR FUSE AND MAIN DISCONNECT – KIRK INTERLOCKED
3. MAIN DSCONNECT AND RESISTOR – ONE PACKAGE
4. CONTROL CABINET TO BE MOUNTED NEXT TO DC CABINETS

D.C. SWITCHBOARD SINGLE LINE DIAGRAM
SCALE: NONE

CHICAGO TRANSIT AUTHORITY
ENGINEERING

SENSITIVE SECURITY INFORMATION

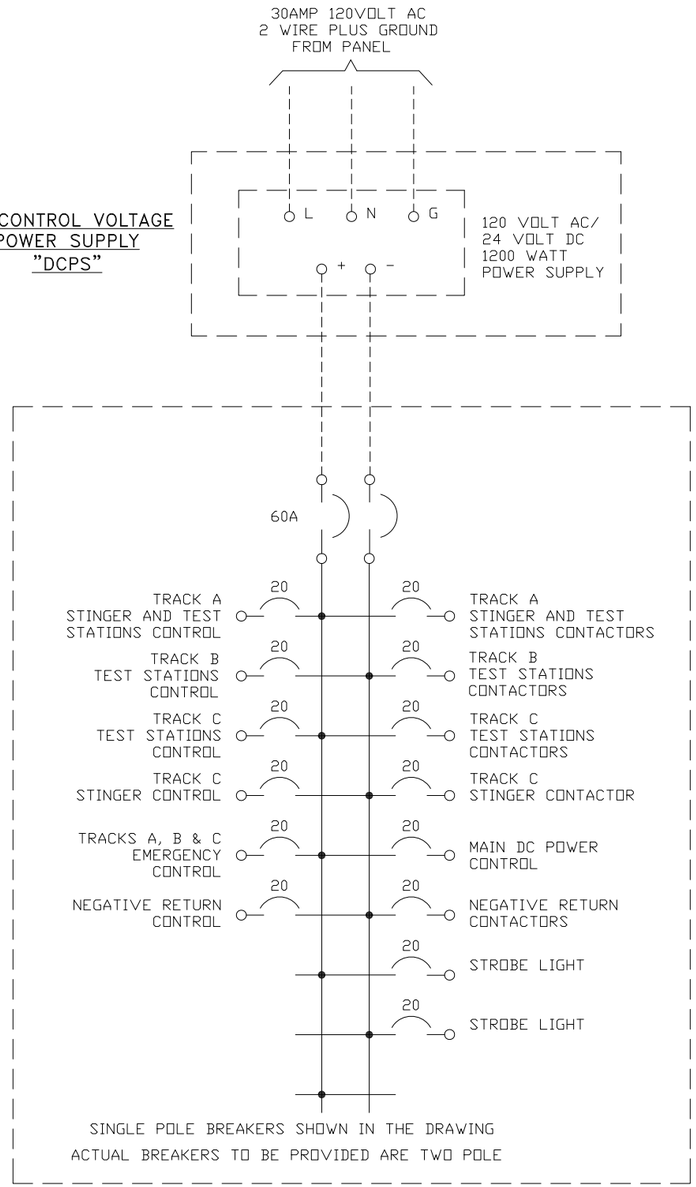
98TH RAIL SHOP
STINGER REPLACEMENT
9800 SOUTH STATE
CHICAGO, ILLINOIS 60628

IN CHARGE	J. HARPER
APPROVED BY	S. MCALEESE
CHECKED BY	BJ/SM/MP
DESIGNED BY	B. JOSE / S.MATHEW
DRAWN BY	B.JOSE / S.MATHEW
PROJECT NO	2011-0074
FILE NAME	

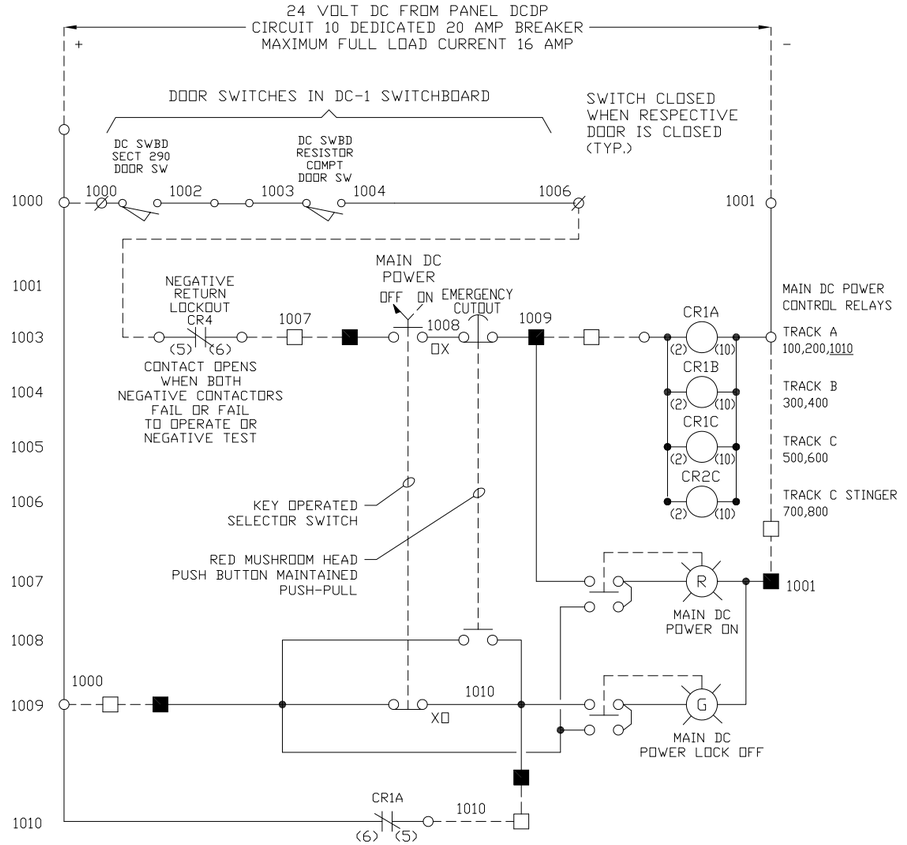
MARK	DATE	DESCRIPTION
	04/25/2013	Revision 1

SHEET TITLE
DC STINGER SYSTEM SINGLE LINE DIAGRAM

E-402



DC CONTROL VOLTAGE
DISTRIBUTION PANEL
"DCDP"



MAIN DC POWER
CONTROL

NOTES AND LEGEND

-ALL FACTORY WIRING 12 GAUGE, 600VOLT, STRANDED TYPE "SIS" INSULATION.
-ALL FACTORY WIRING SUPPLIED WITH MACHINE PRINTED SLEEVE WIRE MARKERS AT EACH TERMINAL POINT.
-ALL CONNECTIONS MADE WITH INSULATED RING TONGUE LUGS (WHERE PERMITTED BY DEVICE) OR INSULATED LOCKING FORK TERMINATIONS.
-CONNECTIONS SHOWN AS SOLID ——— ARE FACTORY CONNECTIONS OR INTERNAL CONNECTIONS AT REMOTE DEVICE.
-CONNECTIONS SHOWN AS DASHED — — — ARE FIELD INTERCONNECTIONS BY OTHERS.

WIRING KEY

-WIRE NUMBERS AND LINE NUMBERS 100 SERIES
TRACK A STINGER AND TEST STATIONS CONTROL

-WIRE NUMBERS AND LINE NUMBERS 200 SERIES
TRACK A STINGER AND TEST STATIONS CONTACTORS

-WIRE NUMBERS AND LINE NUMBERS 300 SERIES
TRACK B STINGER AND TEST STATIONS CONTROL

-WIRE NUMBERS AND LINE NUMBERS 400 SERIES
TRACK B STINGER AND TEST STATIONS CONTACTORS

-WIRE NUMBERS AND LINE NUMBERS 500 SERIES
TRACK C NORTH AND SOUTH STATIONS CONTROL

-WIRE NUMBERS AND LINE NUMBERS 600 SERIES
TRACK C NORTH AND SOUTH TEST STATIONS CONTACTORS

-WIRE NUMBERS AND LINE NUMBERS 700 SERIES
TRACK C STINGER CONTROL

-WIRE NUMBERS AND LINE NUMBERS 800 SERIES
TRACK C STINGER CONTACTORS

-WIRE NUMBERS AND LINE NUMBERS 900 SERIES
TRACK A, B, C EMERGENCY LOCKOUT CONTROLS

-WIRE NUMBERS AND LINE NUMBERS 1000 SERIES
MAIN DC POWER CONTROL

-WIRE NUMBERS AND LINE NUMBERS 1100 SERIES
NEGATIVE RETURN CONTROL

-WIRE NUMBERS AND LINE NUMBERS 1200 SERIES
NEGATIVE RETURN CONTACTORS

-WIRE NUMBERS AND LINE NUMBERS 1400 SERIES
AC WARNING DEVICES

SYMBOLS KEY

- ● -INTERNAL CONNECTION IN RESPECTIVE PANEL
- ⌀ -TERMINAL OR DEVICE IN DC- SWITHBOARD DC-1 OR DC-2
- ○ -TERMINAL OR DEVICE IN DC RELAY PANEL DCRP
- □ -TERMINAL IN DC TERMINAL COMPARTMENT
- ■ -TERMINAL OR DEVICE IN DC CUTOUT PANEL
- ⊙ -TERMINAL OR DEVICE IN NEGATIVE CONTROL PANEL
- ⬡ -TERMINAL OR DEVICE IN NEGATIVE POWER CABINET PC-19 OR PC-20
- ⊘ -TERMINAL AT RESPECTIVE REMOTE DEVICE

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98TH RAIL SHOP
STINGER REPLACEMENT
9800 SOUTH STATE
CHICAGO, ILLINOIS 60628

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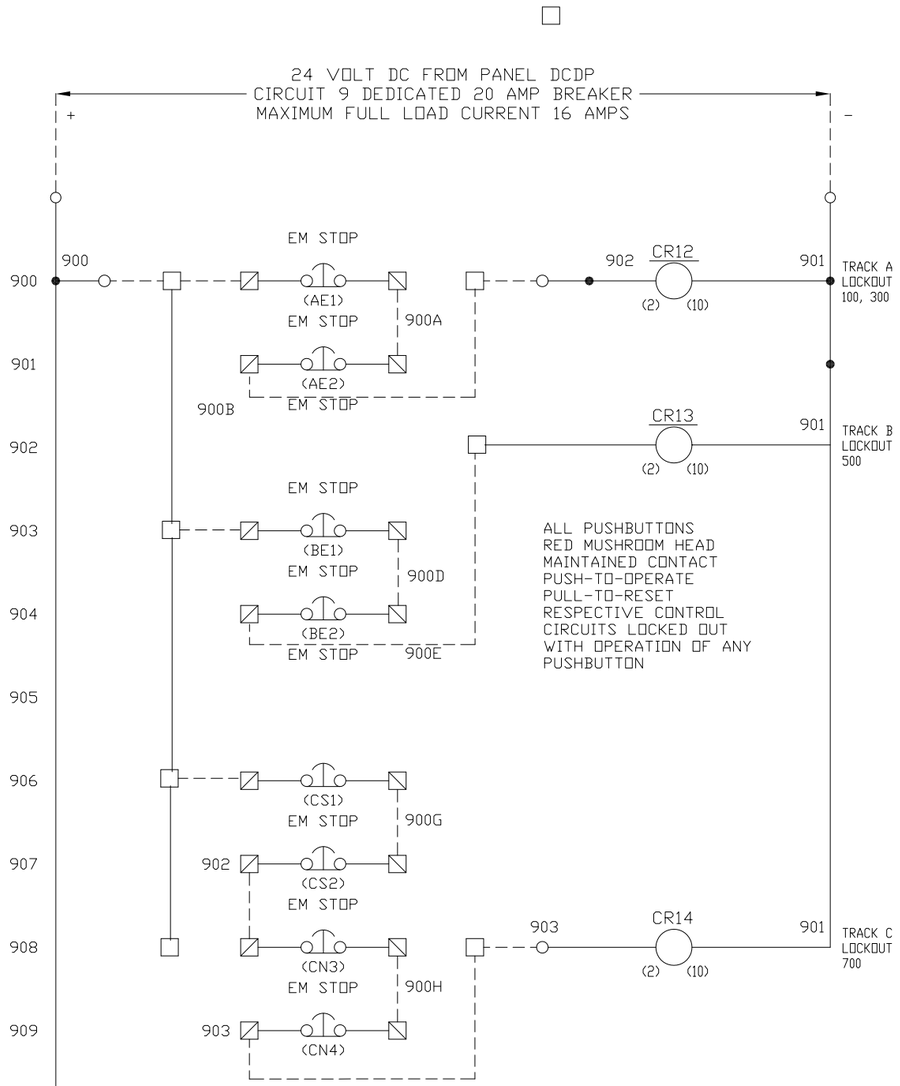
APPROVED BY	S. MCALEESE
CHECKED BY	BJ/SM/MP
DESIGNED BY	B. JOSE / S.MATHEW
DRAWN BY	B.JOSE / S.MATHEW
PROJECT NO	2011-0074
FILE NAME	

MARK	DATE	DESCRIPTION
	04/25/2013	Revision 1

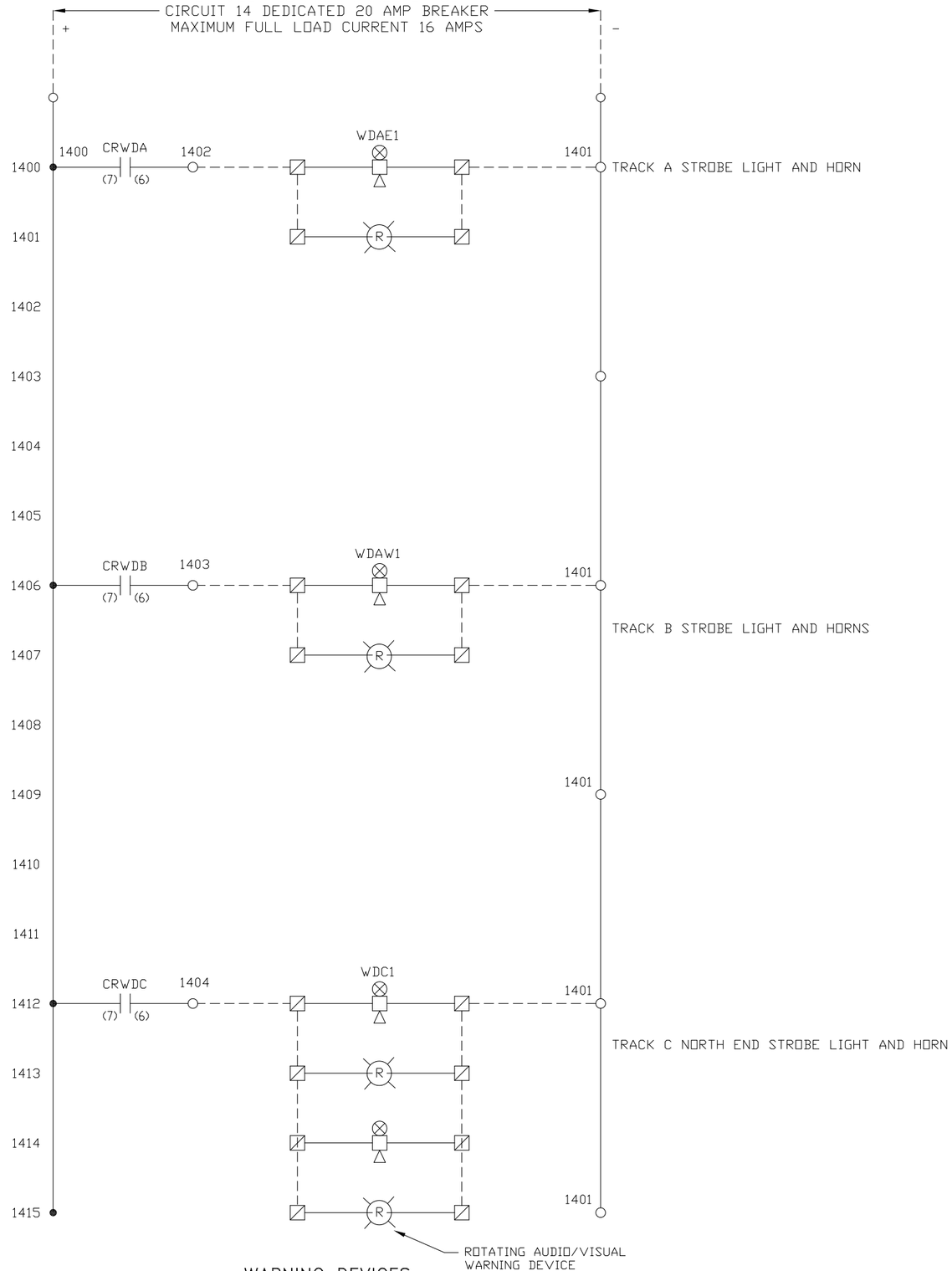
SHEET TITLE

DC CONTROLS
SHEET 1

E-403



TRACKS A, B AND C
EMERGENCY LOCKOUT



WARNING DEVICES

ABOVE RELAYS WITH AC CONTACTS LOCATED IN BARRIERED COMPARTMENT IN DCRP.
AC CONNECTIONS TO BE IDENTIFIED WITH RED COLOR CODE TAPE AT CONNECTION POINTS

CHICAGO TRANSIT AUTHORITY
ENGINEERING

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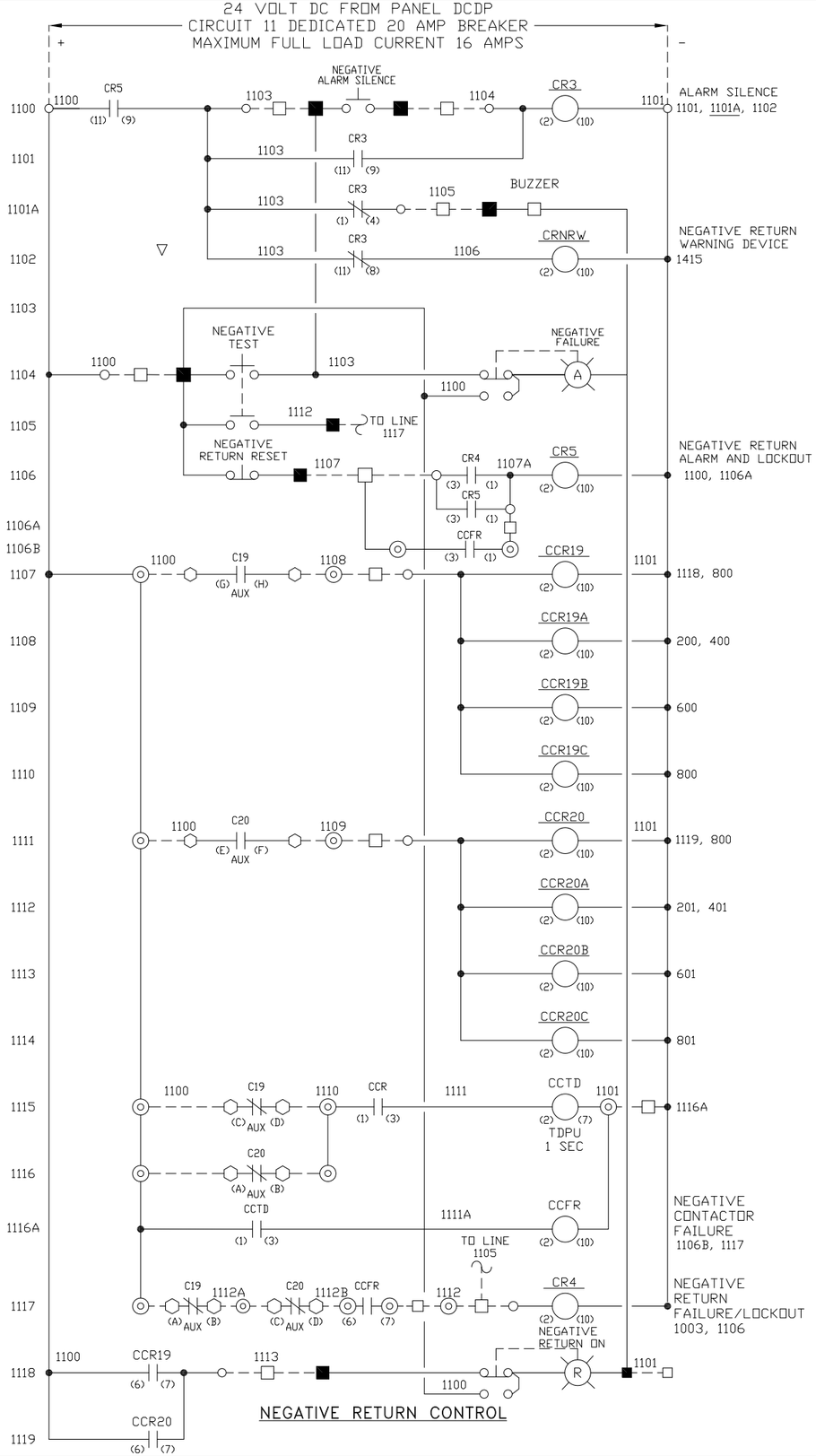
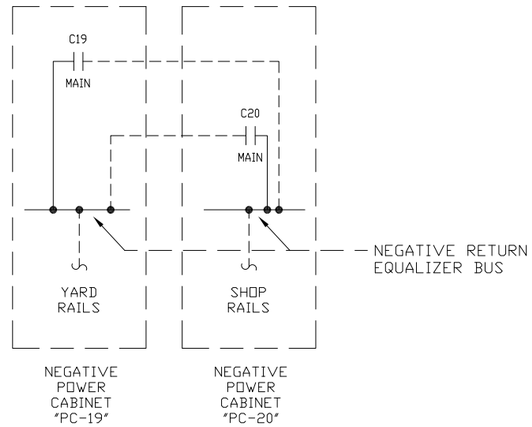
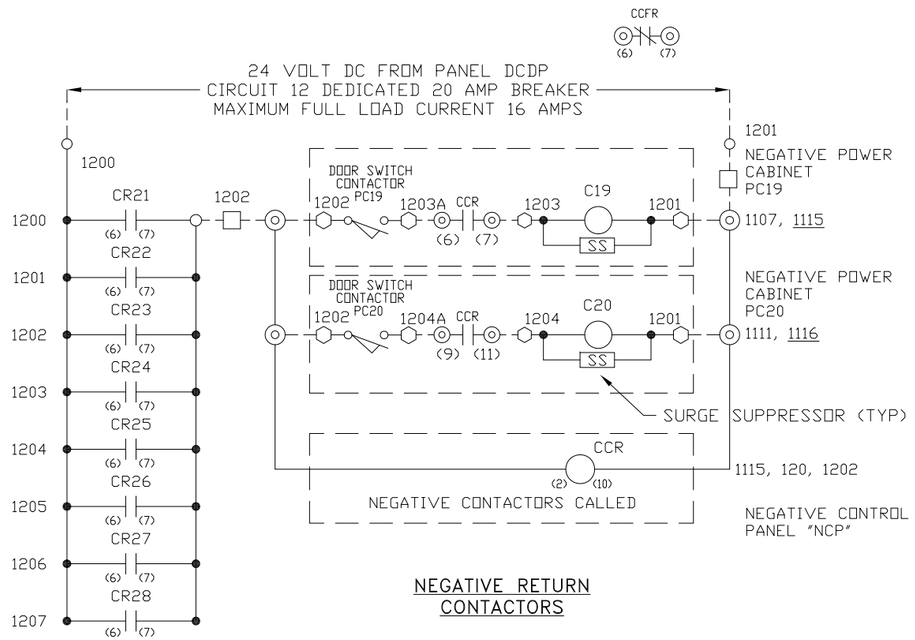
SHEET TITLE

DC CONTROLS
SHEET 2

E - 404







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FILE NAME	

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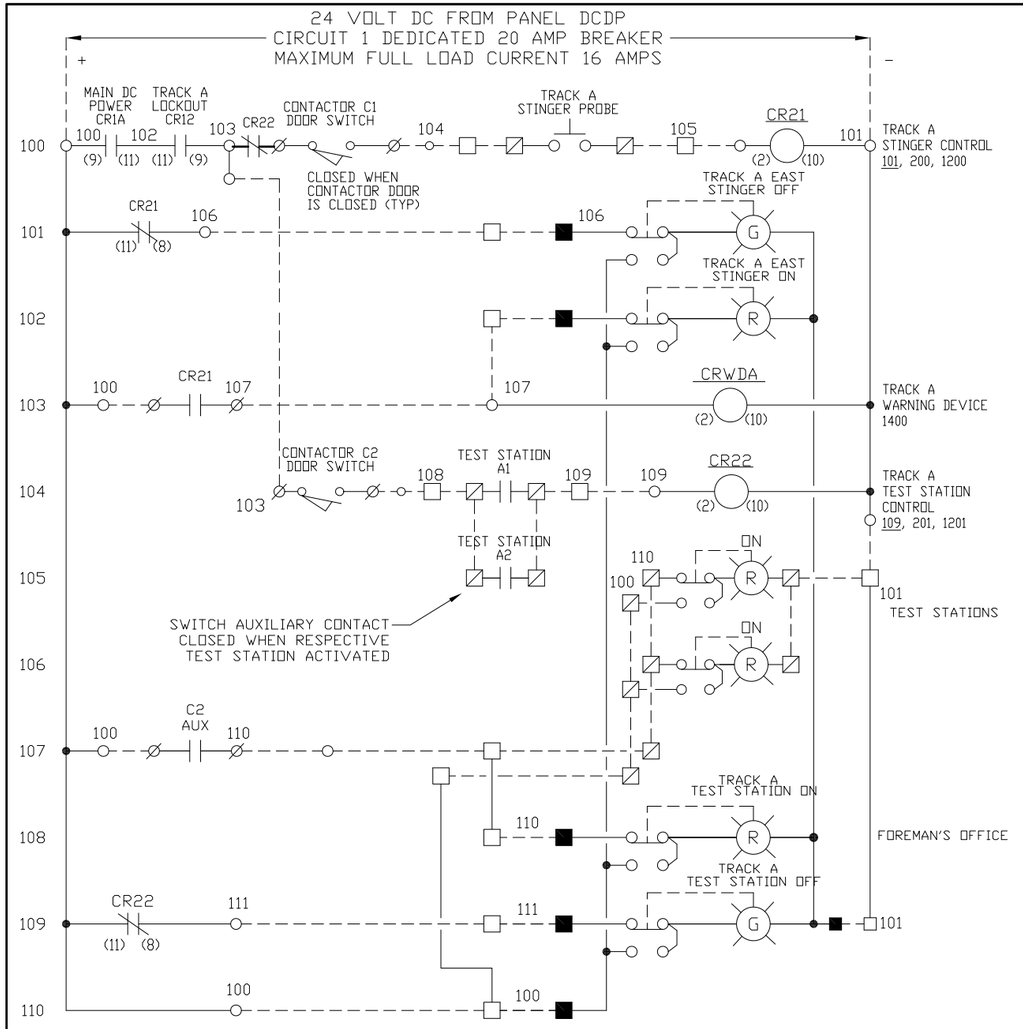
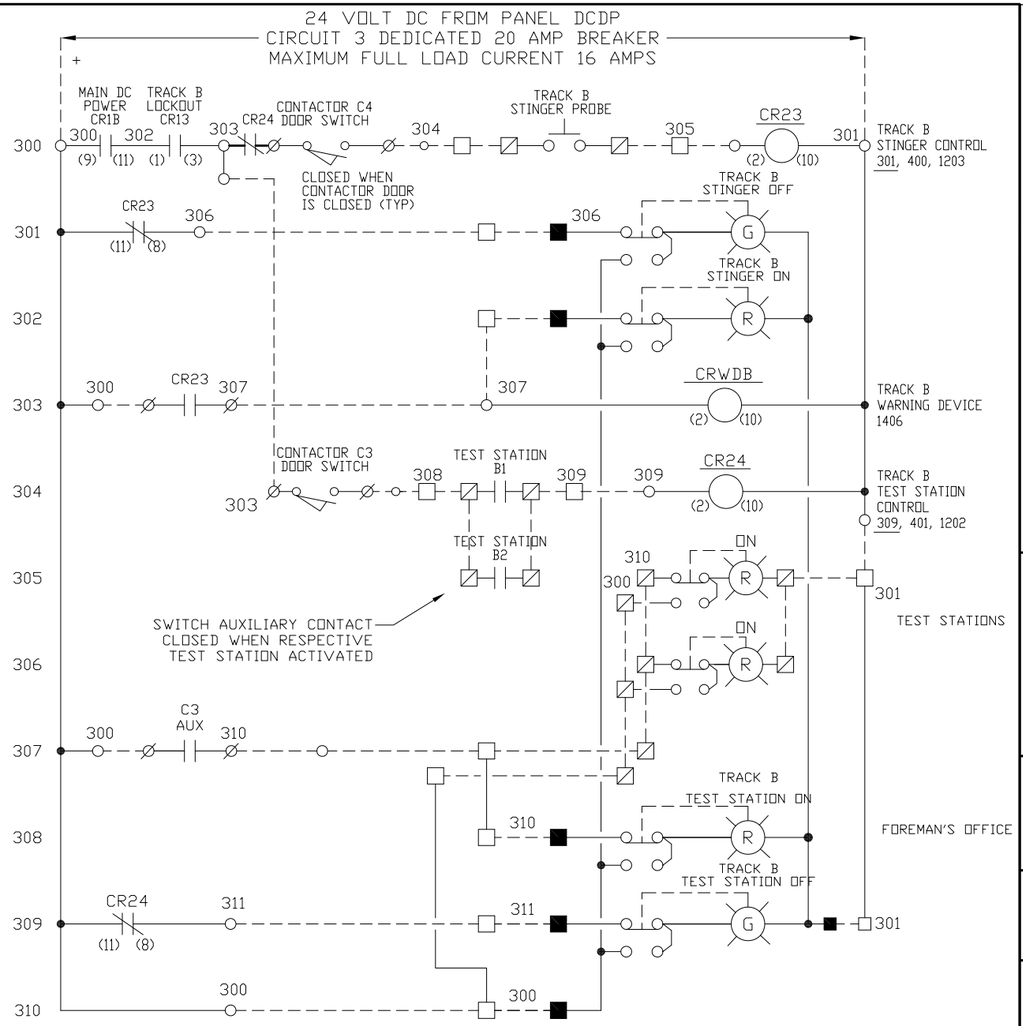
SHEET TITLE

DC CONTROLS
SHEET 3

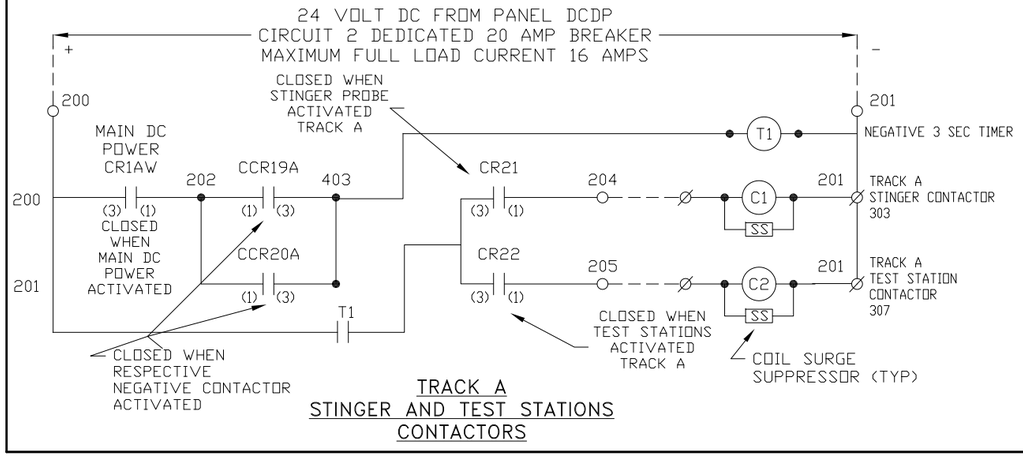
E - 405



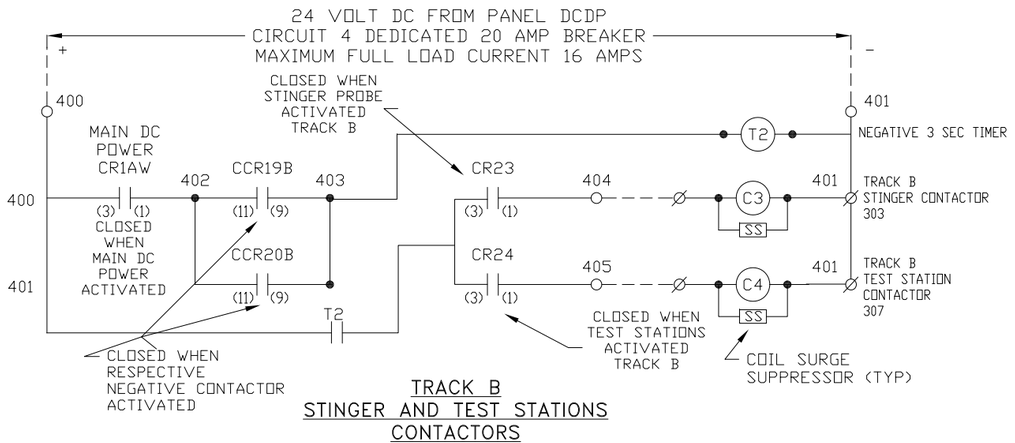
TRACK A
STINGER AND TEST STATION
CONTROL



TRACK B
STINGER AND TEST STATION
CONTROL



TRACK A
STINGER AND TEST STATIONS
CONTACTORS



TRACK B
STINGER AND TEST STATIONS
CONTACTORS

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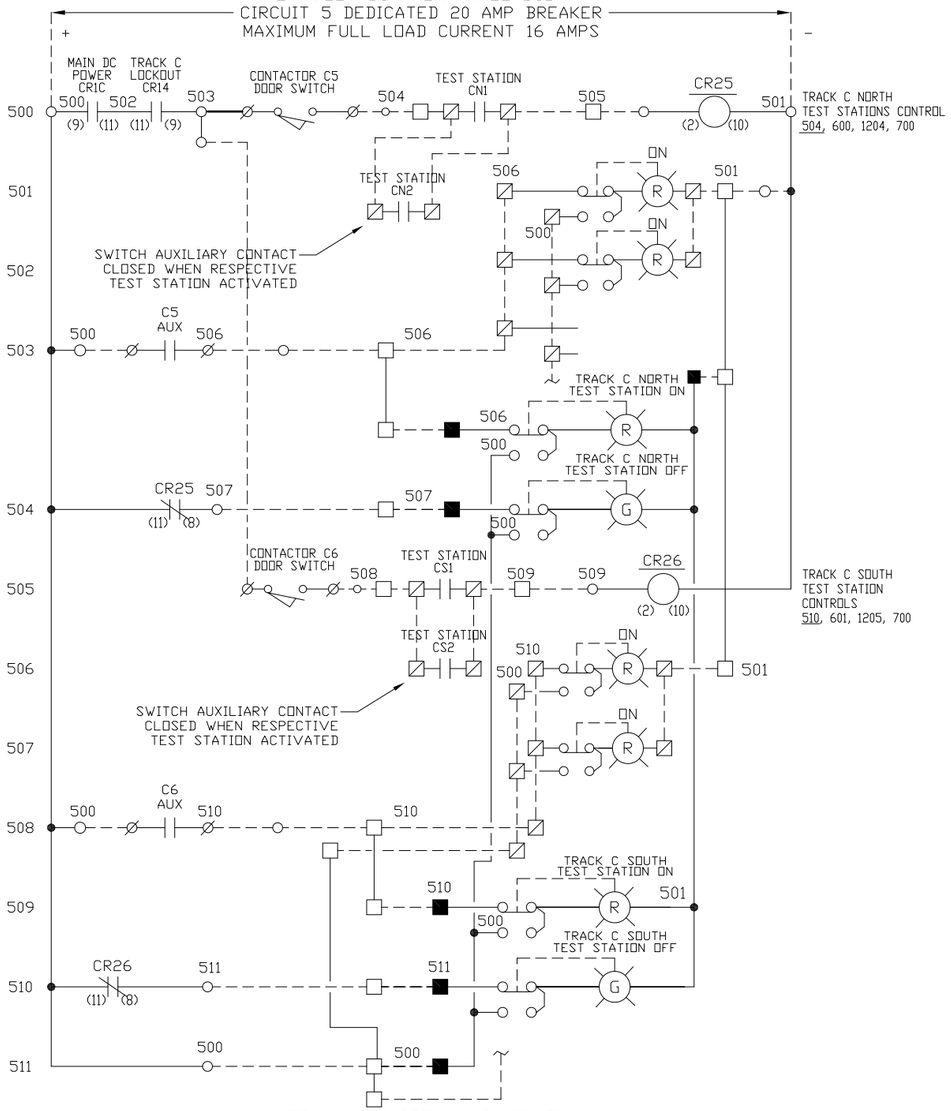
FILE NAME	

MARK	DATE	DESCRIPTION
	04/25/2013	Revision 1

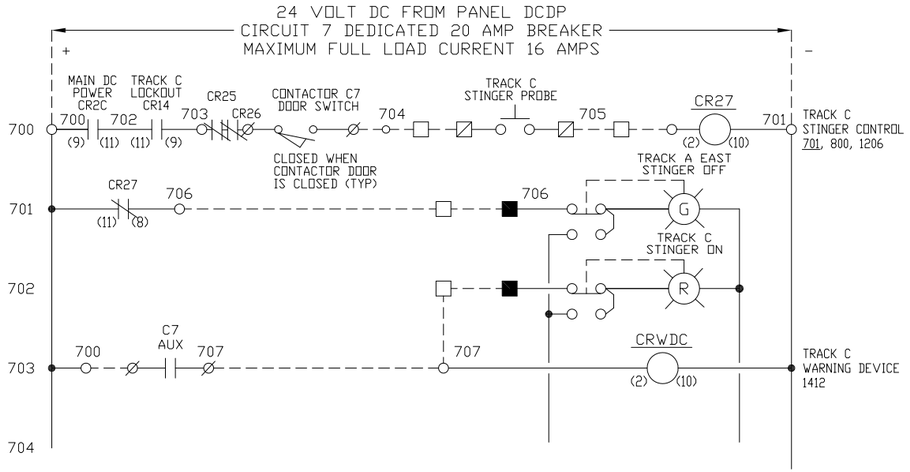
SHEET TITLE

DC CONTROLS
SHEET 4

E - 406



TRACK C NORTH AND SOUTH
TEST STATIONS CONTROL



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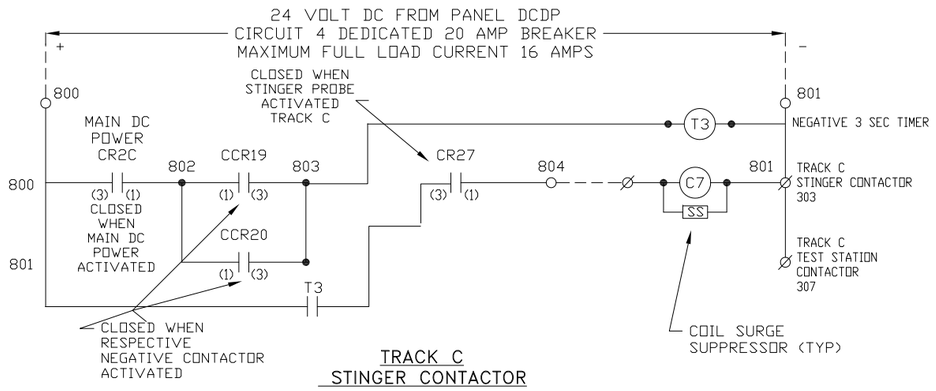
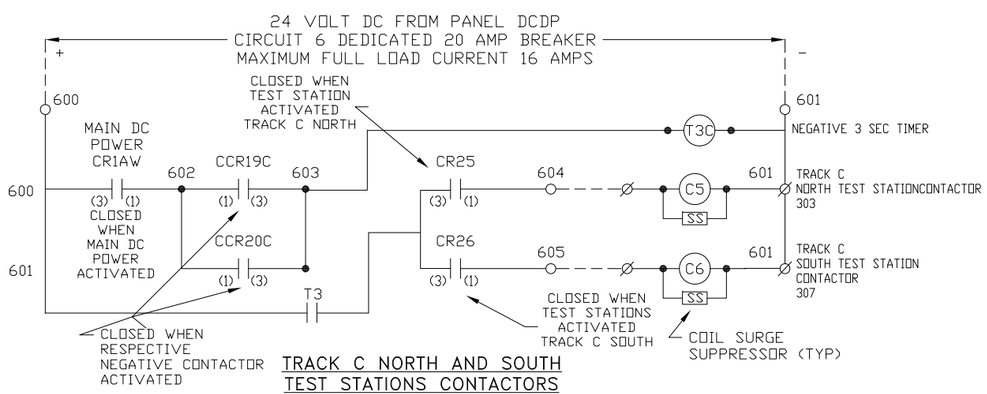
STINGER CONTROL



TRACK C
STINGER CONTACTOR



TRACK C NORTH AND SOUTH
TEST STATIONS CONTACTORS

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ENGINEERING

SENSITIVE SECURITY INFORMATION

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APPROVED BY	S. MCALEESE
CHECKED BY	BJ/SM/MP
DESIGNED BY	B. JOSE / S.MATHEW
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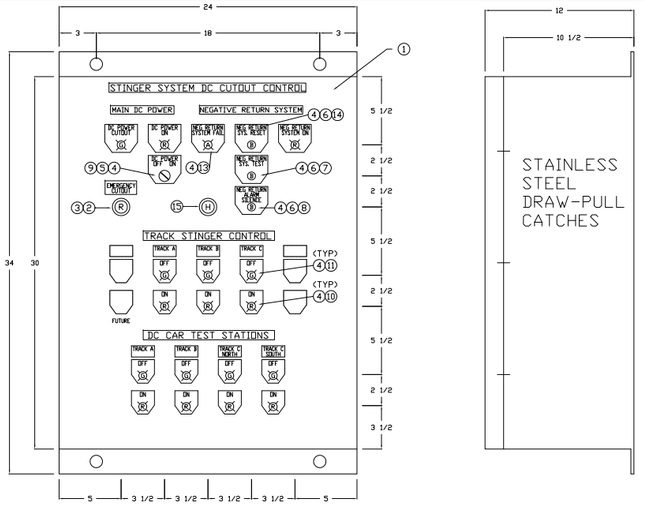
PROJECT NO	2011-0074
FILE NAME	

MARK	DATE	DESCRIPTION
	04/25/2013	Revision 1

SHEET TITLE

DC CONTROLS
SHEET 5

E - 407



NAMEPLATES, SIZE AS REQUIRED, WHITE WITH BLACK 3/16 LETTERS ENGRAVED AS SHOWN ATTACHED WITH STAINLESS STEEL HARDWARE.

FRONT VIEW

SIDE VIEW

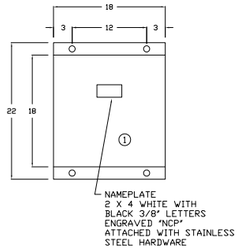
NOTES:

1. ENCLOSURE MANUFACTURED BY SIGNATURE
STEEL GALVANNEAL ENCLOSURE WITH HINGED DOOR SAFETY YELLOW EXTERIOR, WHITE INTERIOR. DOOR PROVIDED WITH CONTINUOUS STAINLESS STEEL HINGE (LEFT SIDE), MOUNTING HARDWARE EXTENDING TO THE INSIDE OF THE ENCLOSURE TO BE INSULATED WITH RTV SILICON ON THE INSIDE OF THE ENCLOSURE.
ENCLOSURE PROVIDED WITH 12 GAUGE BACKPAN 27" X 321" PAINTED WHITE.
ENCLOSURE RATED NEMA 4X
2. ALL CONTROL WIRING AWG #12, STRANDED COPPER, 600VOLT TYPE SIS.
3. ALL WIRES PROVIDED WITH MACHINE PRINTED SLEEVE TYPE WIRE MARKEERS AT EACH TERMINATION POINT.
4. ALL INTERNAL CONNECTIONS MADE WITH PANDUIT INSULATED RING TONGUE LUGS WHEN POSSIBLE.

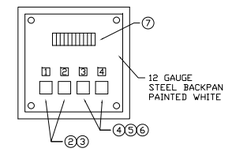
NOTES:

1. ENCLOSURE MANUFACTURED BY SIGNATURE
0.13 THICK NON-CONDUCTIVE MOLDED LAMINATE COMPOSITE WITH HINGED DOOR, SAFETY YELLOW EXTERIOR, WHITE INTERIOR. DOOR PROVIDED WITH CONTINUOUS STAINLESS STEEL HINGE (LEFT SIDE) AND STAINLESS STEEL DRAW PULL CATCHES (RIGHT SIDE) WITH PADLOCK PROVISIONS. HINGE AND CATCH HARDWARE EXTENDING INTO THE ENCLOSURE TO BE INSULATED WITH RTV SILICON ON THE INSIDE OF THE ENCLOSURE.
ENCLOSURE PROVIDED WITH 12 GAUGE BACKPAN PAINTED WHITE.
ENCLOSURE RATED NEMA 4X
2. ALL CONTROL WIRING AWG #12, STRANDED COPPER, 600VOLT TYPE SIS.
3. ALL WIRES PROVIDED WITH MACHINE PRINTED SLEEVE TYPE WIRE MARKERS AT EACH TERMINATION POINT.
4. ALL INTERNAL CONNECTIONS MADE WITH PANDUIT INSULATED RING TONGUE LUGS WHE POSSIBLE, CONNECTIONS TO RELAY SOCKETS MADE WITH INSULATED LOCKING FORK TERMINALS.
5. CONTROL PANEL DESIGNED TO SERVE AS A JUNCTION BOX FOR "PC-19" AND "PC-20"

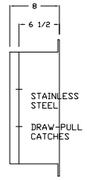
MOLDED COMPOSITE ENCLOSURE 0.13 THICK, YELLOW, NEMA 4X



FRONT VIEW



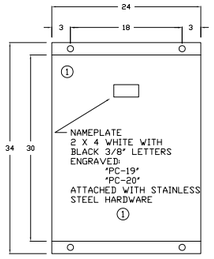
OPEN VIEW



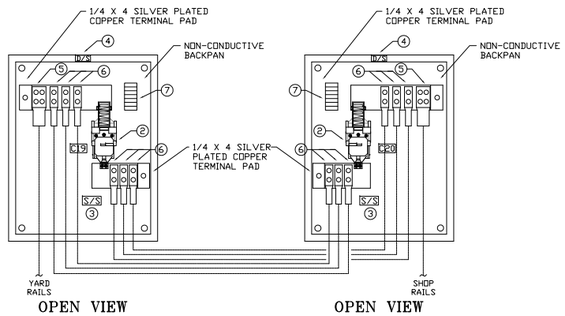
SIDE VIEW

COMPONENT NAMEPLATES 1 X 2 WHITE WITH BLACK 3/8 LETTERS ATTACHED WITH STAINLESS STEEL HARDWARE.
1 - CCFR
2 - CCR
3 - CCTD
4 - SPARE

MOLDED COMPOSITE ENCLOSURE 0.187 THICK, YELLOW, NEMA 4X



FRONT VIEW

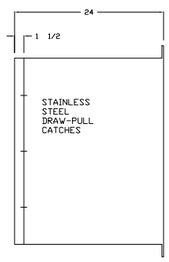


OPEN VIEW
"PC19"

OPEN VIEW
"PC20"

NOTES:

1. ENCLOSURE MANUFACTURED BY SIGNATURE
0.187 THICK NON-CONDUCTIVE MOLDED LAMINATE COMPOSITE WITH HINGED DOOR SAFETY YELLOW EXTERIOR, WHITE INTERIOR. DOOR PROVIDED WITH CONTINUOUS STAINLESS STEEL HINGE (LEFT SIDE) AND STAINLESS STEEL DRAW PULL CATCHES (RIGHT SIDE) WITH PADLOCK PROVISIONS. HINGE AND CATCH HARDWARE EXTENDING INTO THE INSIDE OF THE ENCLOSURE TO BE INSULATED WITH RTV SILICON ON THE INSIDE OF THE ENCLOSURE.
ENCLOSURE PROVIDED WITH WHITE NON-CONDUCTIVE BACKPAN 27" X 31".
ENCLOSURE RATED NEMA 4X
2. TERMINAL PADS MADE FROM 4" X 1/4" SILVER PLATED COPPER.
3. TERMINAL PAD ASSEMBLY HARDWARE AND LUG HARDWARE TO BE SILICON BRONZE.
4. ALL CONTROL WIRING AWG #12, TYPE SIS STRANDED COPPER 600VOLT WITH MACHINE PRINTED SLEEVE TYPE WIRE MARKERS AT EACH TERMINATION POINT.
5. ALL INTERNAL CONNECTIONS MADE WITH PANDUIT INSULATED RING TONGUE LUGS WHEN POSSIBLE.
6. CONNECTIONS TO DC CONTACTORS MADE WITH INSULATED FASTON TERMINALS.

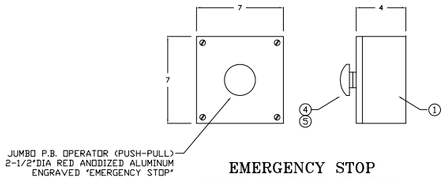


SIDE VIEW

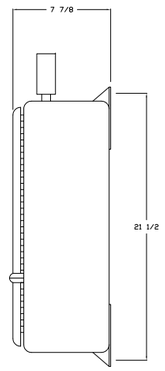
NOTES:

SINGLE DEVICE PUSH BUTTON STATIONS FOR EMERGENCY STOP PUSH BUTTONS AND CAR TEST STATION PUSH-TO-TEST LIGHTS. 0.13 THICK NON-CONDUCTIVE MOLDED LAMINATE COMPOSITE, SAFETY YELLOW WITH MOLDED COVER. COVER ATTACHED WITH STAINLESS STEEL SCREWS THREADED INTO MOLDED INSERTS IN BODY (NON EXPOSED TO INSIDE).

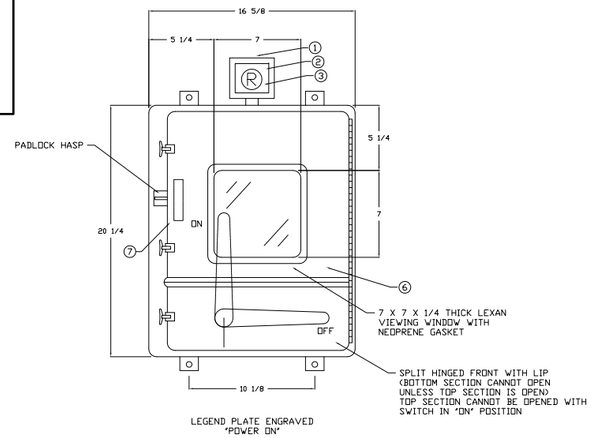
ENCLOSURE RATED NEMA 4X



EMERGENCY STOP
PUSH-BUTTON STATION
ASSEMBLY



SIDE VIEW



AUXILIARY POWER
CAR TEST STATION ASSEMBLY
NEMA 4X

CHICAGO TRANSIT AUTHORITY
ENGINEERING

SENSITIVE SECURITY INFORMATION

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98TH RAIL SHOP
STINGER REPLACEMENT
9800 SOUTH STATE
CHICAGO, ILLINOIS 60628

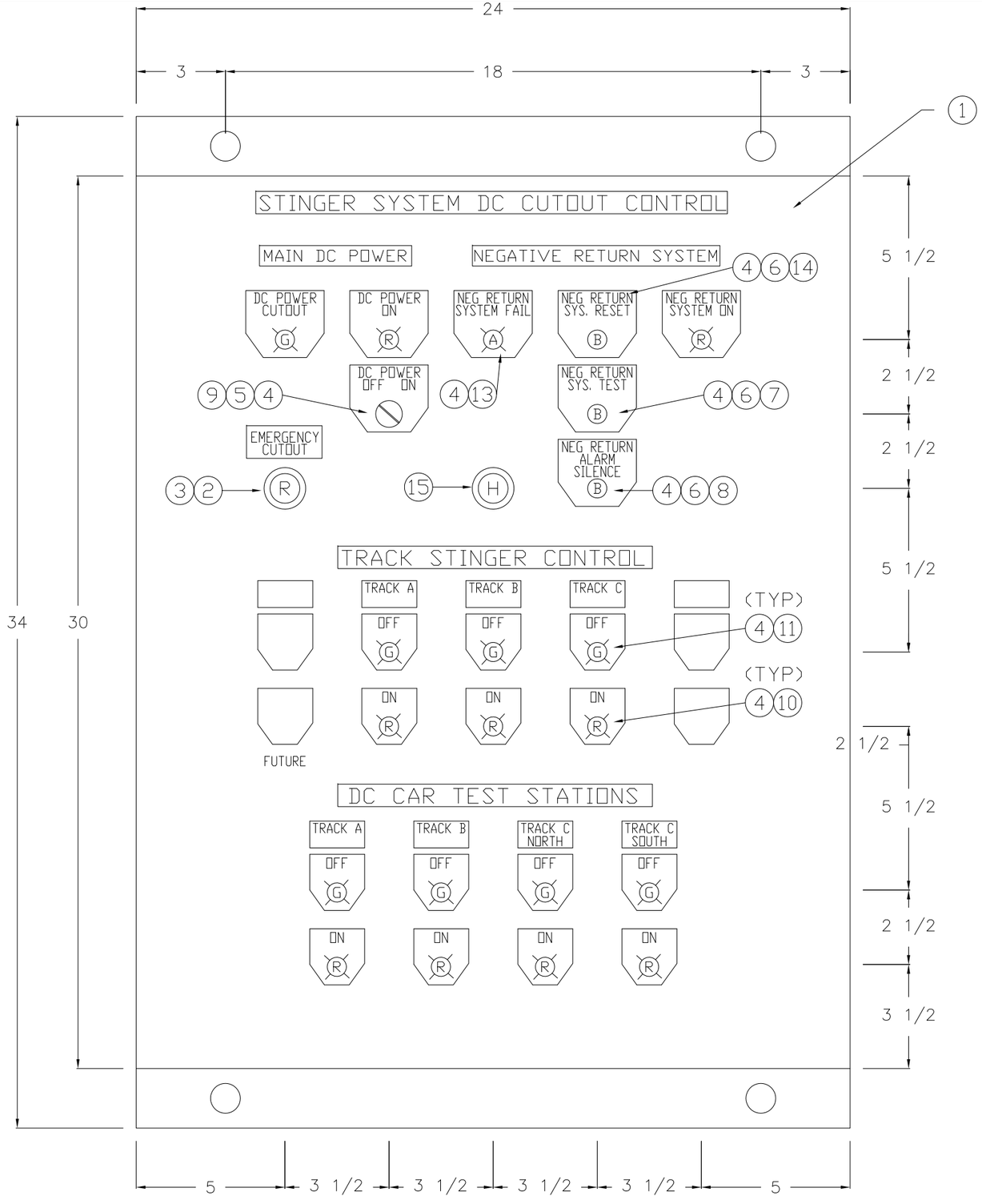
IN CHARGE	J. HARPER
APPROVED BY	S. MCALEESE
CHECKED BY	BJ/SM/MP
DESIGNED BY	B. JOSE / S.MATHEW
DRAWN BY	B.JOSE / S.MATHEW
PROJECT NO	2011-0074
FILE NAME	

MARK	DATE	DESCRIPTION
	04/25/2013	Revision 1

SHEET TITLE

DC CONTROLS
SHEET 6

E-408



NAMEPLATES, SIZE AS REQUIRED, WHITE WITH BLACK 3/16 LETTERS ENGRAVED AS SHOWN ATTACHED WITH STAINLESS STEEL HARDWARE.

CHICAGO TRANSIT AUTHORITY
ENGINEERING

SENSITIVE SECURITY INFORMATION

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DRAWING SCALE IS NOT GUARANTEED.
CTA ASSUMES NO RISK OF LIABILITY FOR ERRORS CAUSED, DIRECTLY OR INDIRECTLY, BY SCALING OF THIS DRAWING.

98TH RAIL SHOP
STINGER REPLACEMENT
9800 SOUTH STATE
CHICAGO, ILLINOIS 60628

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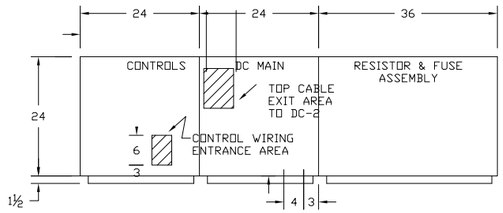
	04/25/2013	Revision 1

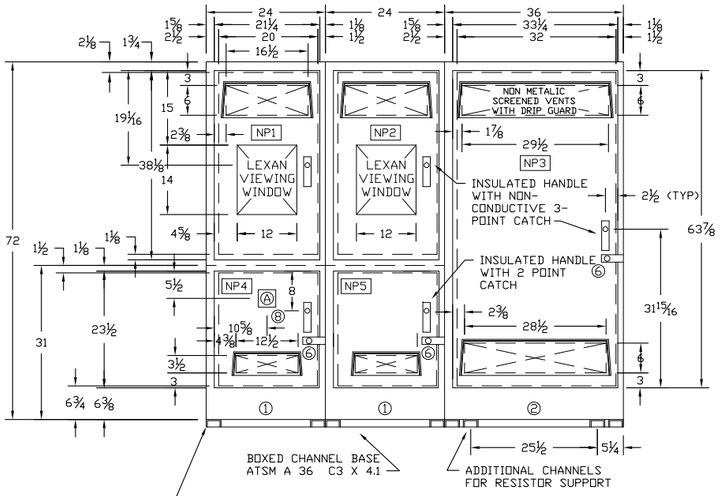
SHEET TITLE

DC CONTROLS SHEET 7

E - 409

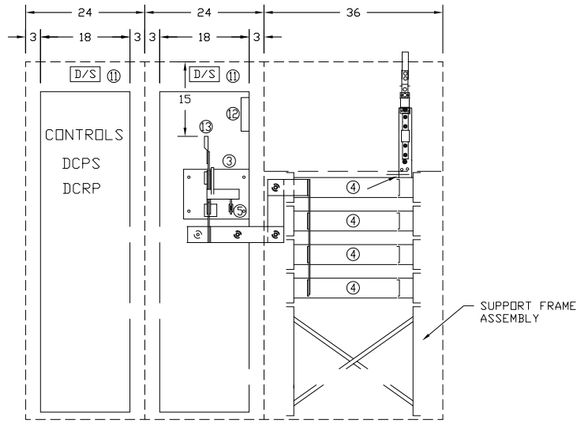


DC-1 ASSEMBLY TOP VIEW CABLE EXIT TO DC-2

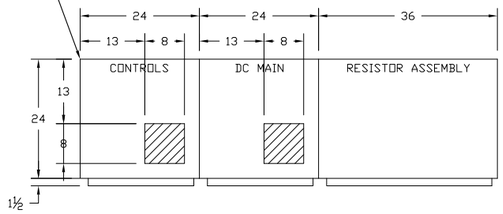


FRONT VIEW

THE CONTROLS CABINET SHALL BE MOVED TO THE RIGHT SIDE OF DRAWING DETAIL DC-2 ON SHEET E-411



OPEN VIEW



BOTTOM CABLE ENTRY ARAEAS

ENGRAVED NAMEPLATES 3 X 6 WHITE WITH BLACK 3/8" LETTERS ATTACHED WITH STAINLESS STEEL HARDWARE	
NP1	CONTROLS-DCPS/DCRP
NP2	DC MAIN SECTION 228
NP3	RESISTOR ASSEMBLY
NP4	METERING COMPARTMENT
NP5	FUSE COMPARTMENT

NOTES:

1. ENCLOSURES MOLDED FIBERGLASS 1/4" THICK SAFETY YELLOW EXTERIOR, WHITE INTERIOR, NON-CONDUCTIVE BACK PAN.

2. HINGES, CONTINUOUS STAINLESS STEEL MOUNTED TO THE OUTSIDE OF THE ENCLOSURE. MOUNTING HARDWARE EXTENDING TO THE INSIDE OF THE ENCLOSURE TO BE INSULATED WITH RTV SILICON ON THE INSIDE OF THE ENCLOSURE.

3. DOOR HANDLES INSULATED FROM INSIDE OF ENCLOSURE AND SUPPLIED WITH NON-CONDUCTIVE LATCH RODS.

4. KEY INTERLOCKS PROVIDED SO THAT ONLY METERING COMPARTMENT AND FUSE COMPARTMENT INTERLOCKED WITH MAIN SWITCHE SO THAT ANY COMPARTMENT DOOR CAN NOT BE OPENED UNLESS BOTH MAIN SWITCHES ARE OFF.

5. POWER BUS AND CONTROL CONNECTIONS BETWEEN CUBICLES TO BE SEALED WITH RTV SILICON.

6. ASSEMBLY HARDWARE BETWEEN CUBICLES AND HARDWARE OR DEVICES EXTENDING THROUGH THE ENCLOSURE ARE TO BE INSULATED WITH RTV SILICON ON THE INSIDE OF THE ENCLOSURE.

7. METER EXTENDING THROUGH DOOR TO BE INSULATED WITH HEAT SHRINK TUBING ON INSIDE OF ENCLOSURE AND SEALED WITH RTV SILICON.

8. ALL BUS 1000 AMP/SQIN SILVER PLATED COPPER 1/2 X 2 FULL OVER LAP JOINTS.

9. ALL BUS ASSEMBLY AND MOUNTING HARDWARE TO BE SILICON-BRONZE.

10. ALL BUS PROVIDED WITH 1/4" THICK GLASTIC BARRIERS (EXCEPT RESISTOR CONNECTIONS).

11. ALL CONTROL WIRING AWG#12, TYPE "SIS", STRANDED 600 VOLT, WITH MACHINE PRINTED SLEEVE TYPE WIRE MARKERS. ALL CONNECTIONS TO BE MADE WITH INSULATED RING TONGUE LUGS WHERE POSSIBLE. CONNECTIONS TO DEVICES WITH CAPTIVE SCREWS AND RELAY SOCKETS MADE WITH INSULATED LOCKING FORK TERMINALS. CONNECTIONS TO DC CONTACTORS MADE WITH INSULATED FASTON TERMINALS.

CHICAGO TRANSIT AUTHORITY
ENGINEERING

SENSITIVE SECURITY INFORMATION

98TH RAIL SHOP
STINGER REPLACEMENT
9800 SOUTH STATE
CHICAGO, ILLINOIS 60628

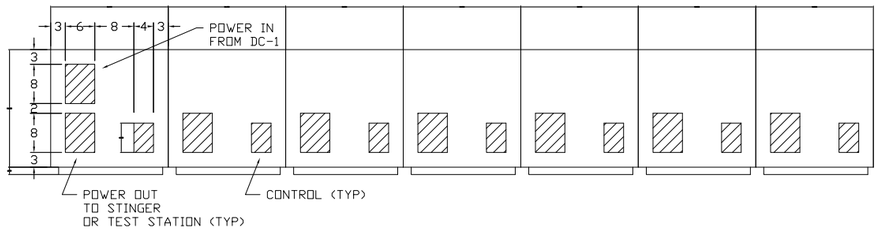
IN CHARGE	J. HARPER
APPROVED BY	S. MCALEESE
CHECKED BY	BJ/SM/MP
DESIGNED BY	B. JOSE / S.MATHEW
DRAWN BY	B.JOSE / S.MATHEW
PROJECT NO	2011-0074
FILE NAME	

MARK	DATE	DESCRIPTION
	04/25/2013	Revision 1

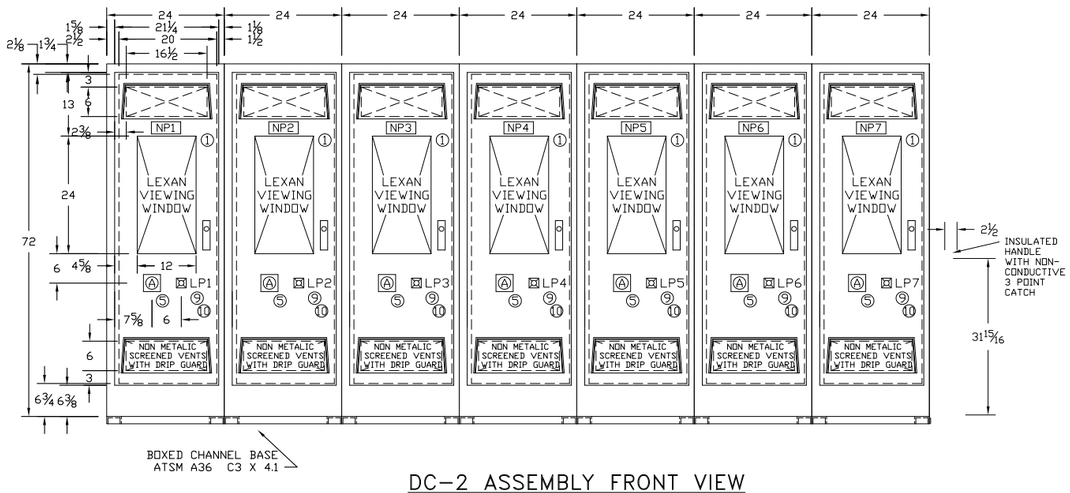
SHEET TITLE

DC CONTROLS
SHEET 8

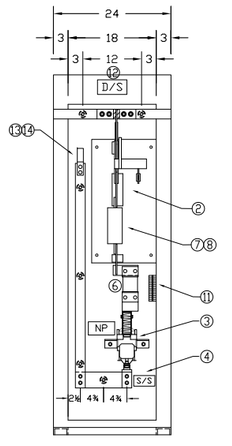
E-410



DC-2 ASSEMBLY TOP VIEW
TOP ENTRANCE/TOP EXIT



DC-2 ASSEMBLY FRONT VIEW



TYPICAL OPEN VIEW

NOTES:

1. ENCLOSURES MOLDED FIBERGLASS 1/4" THICK SAFETY YELLOW EXTERIOR, WHITE INTERIOR, NON-CONDUCTIVE BACK PAN.
2. HINGES, CONTINUOUS STAINLESS STEEL MOUNTED TO THE OUTSIDE OF THE ENCLOSURE. MOUNTING HARDWARE EXTENDING TO THE INSIDE OF THE ENCLOSURE TO BE INSULATED WITH RTV SILICON ON THE INSIDE OF THE ENCLOSURE.
3. DOOR HANDLES INSULATED FROM INSIDE OF ENCLOSURE AND SUPPLIED WITH NON-CONDUCTIVE LATCH RODS.
4. MAIN POWER BUS AND CONTROL CONNECTION BETWEEN CUBICLES TO BE SEALED.
5. ASSEMBLY HARDWARE BETWEEN CUBICLES AND METALLIC HARDWARE OR DEVICES EXTENDING THROUGH THE ENCLOSURE ARE TO BE INSULATED WITH RTV SILICON ON THE INSIDE OF THE ENCLOSURE.
6. PUSH TO TEST LIGHTS AND METERS EXTENDING THROUGH DOOR TO BE INSULATED WITH HEAT SHRINK TUBING ON INSIDE OF ENCLOSURE AND SEALED WITH RTV SILICON.
7. MAIN BUS 1000AMP/SQ IN. SILVER PLATED COPPER 1/2" X 2" FULL OVERLAP JOINTS.
8. CUBICLE BUS 1/4" X 2" OR (1/4" X 3" FOR LANDING PADS OR ADAPTERS) 1000AMP/SQ IN. 500 AMP MINIMUM RATING.
9. ALL BUS AND ASSEMBLY MOUNTING HARDWARE TO BE SILICON BRONZE.
10. MAIN BUS PROVIDED WITH 1/4" THICK GLASTIC BARRIERS.
11. ALL CONTROL WIRING AWG #12, TYPE "SIS" STRANDED 600VOLT, WITH MACHINE PRINTED SLEEVE TYPE WIRE MARKERS, ALL CONNECTIONS MADE WITH INSULATED RING TONGUE LUGS WHERE POSSIBLE. CONNECTIONS TO DEVICES WITH CAPTIVE SCREWS AND RELAY SOCKETS MADE WITH INSULATED LOCKING FORK TERMINALS. CONNECTIONS TO DC CONTACTORS MADE WITH INSULATED FASTON TERMINALS.
12. STINGER ASSEMBLIES (3)
    SUPPLIED WITH:
    200AMP FUSE
    3/0 TO 250MCM LOAD LUG
13. TRACK A B AND C TEST STATION ASSEMBLIES (4) SUPPLIED WITH:
    300AMP FUSE
    350MCM TO 500MCM LOAD LUG
14. MAIN SERVICE LUGS IN CUBICLE
    (2) 500MCM LUGS OR 1 1500 MCM LUG (TO BE DETERMINED)

NAMEPLATES (CUBICLE)

ENGRAVED NAMEPLATES 2 X 4 WHITE WITH BLACK 3/8" LETTERS ATTACHED WITH STAINLESS STEEL HARDWARE		
NP1	STINGER	TRACK A
NP2	TEST STATIONS	TRACK A
NP3	STINGER	TRACK B
NP4	TEST STATIONS	TRACK B
NP5	TEST STATIONS	TRACK C NORTH
NP6	TEST STATIONS	TRACK C SOUTH
NP7	STINGER	TRACK C

LEGEND PLATES

ENGRAVED LEGEND PLATES WHITE FIELD 1/8" BLACK LETTERS JUMBO 2" SQUARE C/H #10250TLP76		
LP1	STINGER	TRACK A POWER ON
LP2	TEST STATIONS	TRACK A POWER ON
LP3	STINGER	TRACK B POWER ON
LP4	TEST STATIONS	TRACK B POWER ON
LP5	TEST STATIONS	TRACK C NORTH POWER ON
LP6	TEST STATIONS	TRACK C SOUTH POWER ON
LP7	STINGER	TRACK C POWER ON

NAMEPLATES (DEVICE)

ENGRAVED NAMEPLATES 1 X 3 WHITE WITH BLACK 3/8" LETTERS ATTACHED WITH STAINLESS STEEL HARDWARE	
LOCATION	ENGRAVING
CUBICLE 1	C1
CUBICLE 2	C2
CUBICLE 3	C3
CUBICLE 4	C4
CUBICLE 5	C5
CUBICLE 6	C6
CUBICLE 7	C7

CHICAGO TRANSIT AUTHORITY
ENGINEERING

SENSITIVE SECURITY INFORMATION

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98TH RAIL SHOP
STINGER REPLACEMENT
9800 SOUTH STATE
CHICAGO, ILLINOIS 60628

IN CHARGE	J. HARPER
APPROVED BY	S. MCALEESE
CHECKED BY	BJ/SM/MP
DESIGNED BY	B. JOSE / S.MATHEW
DRAWN BY	B.JOSE / S.MATHEW
PROJECT NO	2011-0074
FILE NAME	

MARK	DATE	DESCRIPTION
	04/25/2013	Revision 1

SHEET TITLE

DC CONTROLS
SHEET 9

E-411

ADDENDUM 1

SPECIAL CONDITIONS

SPECIFICATION NO. CTA 2011-0074A
DRAWING NOS. E-402; E-403; E-404; E-405; E-406; E-407;
E-408; E-409; E-410; & E-411
CONTRACT NO. C13RI101382206

PERFORMANCE BOND/ PAYMENT BOND/ INSURANCE
None required.

SCOPE OF WORK
The purpose of this contract is to provide a complete Power Control System required to distribute power to the existing stinger equipment located at CTA's 98th Street Rail Shop. No stinger tracks or trolleys are required to be supplied. The Power Control System will consist of various components, including: Ten (10) cabinets of 1000 Amp, 750 volt DC Switchboard assemblies; One (1) DC Cutout Panel (Foreman's Office); Two (2) Negative Contactor Assemblies; One (1) Negative Control Panel; Eight (8) DC auxiliary power Car Test Stations; Nine (9) Emergency Stop Pushbutton Stations; **Six (6)** Warning devices; and One (1) set of duplicate spare fuses and hook stick. This equipment will serve to upgrade the existing stinger system at the 98th Street Rail Shop in order to test the functionality of rail car electronics and motors. The equipment will be installed by CTA personnel. It is CTA's intent that the Contractor supply all the assembled equipment needed (except the stingers) ready for installation in order to be a complete Power Distribution System that is fully functional and operate as intended.

PROPOSAL PAGE PREPARATION
The Bidder shall state on the Proposal Page attached the lump sum total delivered price for all items required to provide a complete Power Control System required to distribute power to the existing stinger equipment located at CTA's 98th Street Rail Shop. The lump sum total price shall include all applicable charges and represent the firm delivered price. In addition, the Bidder is to list a contact person and their terms of payment.

Bidder is to submit any literature and specification sheets as required to evaluate the various components of the Power Control System that they propose to furnish. The specification sheet must list the dimensions and all pertinent criteria associated with that part number. CTA reserves the right to determine if the brand/product offered is acceptable or not acceptable.

DELIVERY
The various assembled components of the Power Control System are to be delivered to the Chicago Transit Authority at 9800 S. State, Chicago, Il. 60628, Attention: Mr. Byju Jose. Delivery is to be on weekdays between the hours of 8:00 a.m. to 2:00 p.m. (no holidays). The Contractor shall notify Mr. Byju Jose at (312) 681-4927 no less then forty-eight (48) hours prior to delivery.

SPECIAL CONDITIONS (Continued)

SPECIFICATION NO. CTA 2011-0074A
DRAWING NOS. E-402; E-403; E-404; E-405; E-406; E-407;
E-408; E-409; E-410; & E-411
CONTRACT NO. C13RI101382206

DELIVERY (continued)

The complete Power Control System including the switchboard assemblies, distribution panel, test boxes, contactor assemblies, control panel, pushbutton stations, warning devices and various miscellaneous components shall be delivered within a maximum of twenty-two (22) weeks from the date of receipt of the executed contract document.

PRE-BID MEETING/ SITE INSPECTION

A pre-bid meeting will be scheduled prior to the bid opening in order to allow for questions requiring servicing and to allow for any technical questions, concerns, and requirements as stated in our bid proposal. Bidders will be notified as to time, date and place.

Attendance is strongly encouraged. By submitting a bid for this requirement the Bidder accepts a clear understanding of the switchboard assemblies, distribution panel, test boxes, contactor assemblies, control panel, pushbutton stations, warning devices and various miscellaneous components required to distribute power to the existing stinger equipment, the operating conditions, and the performance criteria expected of the Power Control System to be supplied by the Contractor awarded this contract.

QUALITY

The standard of quality for this specification is based on the detailed information supplied in the referenced specification. Competitive products will be compared to the examples herein mentioned and will be considered as complying with this specification if judged equal in performance, design, construction, sturdiness and overall workmanship.

BASIS OF AWARD

Award will be made to the Bidder submitting the lowest lump sum total delivered price who is quoting acceptable product for the complete Power Control System and whose bid is found to be both responsive and responsible.

QUALIFICATIONS

Prospective Bidders are required to have a minimum of **three (3) years' experience with AC switchboard manufacturing.** Bidders requested to verify this requirement are to be able to provide proof of their facilities satisfactory to the Authority, as well as experienced personnel on staff to provide Engineering assistance to the Authority if needed. Failure to satisfy this requirement to the satisfaction of the Authority shall be grounds for finding your bid non-responsive.

SPECIAL CONDITIONS (Continued)

SPECIFICATION NO. CTA 2011-0074A
DRAWING NOS. E-402; E-403; E-404; E-405; E-406; E-407;
E-408; E-409; E-410; & E-411
CONTRACT NO. C13RI101382206

REFERENCES

Bidder is to submit upon request by the Authority with a list of not less than three (3) customers with whom **they have provided AC switchboard assembly work**. Bidder is to include the company name, phone number and contact person. Failure to satisfy this requirement to the satisfaction of the Authority shall be grounds for finding your bid non-responsive.

WARRANTY

The various components of the Power Distribution System being supplied for the stinger equipment with all related accessories and components shall be covered for a minimum of one (1) year for both material and labor from the date of acceptance by authorized CTA personnel. **Note:** Shipment costs of any faulty equipment/ parts will be borne by the Contractor.

WARRANTY CLAIMS

In the event that a vendor fails to pay approved or partially approved warranty claims within 60 days of submission, the Authority shall send the vendor written notice seeking immediate payment of the outstanding claims. If the vendor fails to pay the outstanding claims within 5 days of vendor's receipt of the written notice, the Purchasing Department shall issue a notice to cure letter providing the vendor with 10 days to cure the default. If the vendor fails to cure the default, the Authority may, at its discretion, deduct the Authority's costs from 1) any unpaid contract funds, 2) any contract retainage amounts or 3) a maintenance or performance bond. If the deductions do not fully satisfy the outstanding claims, the Authority may seek additional remedies. All remedies shall be inclusive of applicable interest payments.

PAYMENT

Payment will be made upon receipt by the Chicago Transit Authority Accounts Payable of Invoice(s) and Acceptance Certificate indicating that all of the various components of the Power Distribution System for the stinger equipment have been received as required and accepted by authorized CTA personnel. In addition, drawings/manuals are to have been received. Payments will be made in accordance with the terms of this Contract (Net 30 days) and/or Contractor invoice(s), whichever is most favorable to the Authority. Payment date(s) shall be calculated from receipt of invoice or final acceptance of goods or service, whichever is later. If Contractor does not complete the payment terms listed on the Proposal Page (P-1), then payment shall be rendered as Net 30 days. Invoices must be presented only by the vendor to which a purchase order is awarded. Invoices received from a third party will not be honored unless prior written approval from the Purchasing Agent has been obtained.

SPECIAL CONDITIONS (Continued)

SPECIFICATION NO. CTA 2011-0074A
DRAWING NOS. E-402; E-403; E-404; E-405; E-406; E-407;
E-408; E-409; E-410; & E-411
CONTRACT NO. C13RI101382206

ELECTRONIC FUND TRANSFER

CTA has adopted Electronic Fund Transfer (EFT) as the preferred method of payment for vendor invoices. An EFT enrollment form will be provided to the successful bidder(s) with the executed contract and must be completed to enable payment of vendor accounts by this method. If awarded a contract, provide the completed EFT form to the CTA Purchasing Administrator identified on the title page.

MANUALS

The Contractor shall furnish a total of three (3) comprehensive sets of service and maintenance manuals covering all aspects of the operation of the equipment and it's sub-assemblies for the complete Power Control System provided. These are to be complete manuals including wiring schematics and parts lists required for servicing the power control system. Finalized "as built" versions are to be provided after contract award. Manuals can be supplied either in print form or in a CD-ROM format. The service and parts manuals are to be delivered to the Chicago Transit Authority at 9800 S. State Street, Chicago, Il. 60628, Attention: Mr. Bjju Jose.

DRAWINGS

The Contractor shall supply a total of three (3) sets of complete "as-built" shop drawings for the complete Power Control System provided upon delivery of the equipment to the Attention of Mr. Byju Jose at 9800 S. State Street, Chicago, Il. 60628.

ACCEPTANCE

A successful demonstration of the Power Distribution System's operating capabilities to operate and function as required and as stated in our detailed specification by authorized CTA personnel shall constitute acceptance by the Authority.

PACKAGING & MARKING

The complete Power Control System with all related accessories and components shall be packed, crated, protected and loaded in accordance with good commercial practice to assure arriving at the destination without damage. Packaged or unpacked materials shall be marked or tagged with the Contractor's name, Chicago Transit Authority's purchase order number, and the quantity in the carton.

SPECIAL CONDITIONS (Continued)

SPECIFICATION NO. CTA 2011-0074A
DRAWING NOS. E-402; E-403; E-404; E-405; E-406; E-407;
E-408; E-409; E-410; & E-411
CONTRACT NO. C13RI101382206

TERMINATION FOR CONVENIENCE

The Authority may terminate this Agreement, in whole or in part, without cause, at any time by written notice to the Contractor whenever the Authority determines that such termination is in the best interest of the Authority. Upon receipt of written notice of termination, all services and any other performance hereunder by the Contractor shall cease to the extent specified in the notice of termination. In the event of termination in whole, the Contractor shall prepare a final invoice within thirty (30) days of termination reflecting the services actually furnished pursuant to this Agreement to the satisfaction of the Authority and for which no previous invoice was submitted to the Authority.

ETHICS ORDINANCE

The Contractor agrees to comply with the CTA Code of Ethics, CTA Ordinance No. 004-99, as amended from time to time, the provisions of which are hereby incorporated into this Agreement. The Contractor further agrees that any contract negotiated, entered into or performed in violation of the Code of Ethics shall be voidable as to the CTA.

COMPLIANCE WITH LAWS, REGULATIONS AND CODES

If any part of this Specification shall be at date of issue, or shall later become, in non-conformity with current or future City, County, State or Federal Laws and/or Codes or Regulations, because of materials or requirements specified therein, Chicago Transit Authority shall have the right to negotiate for and accept or reject substitute materials and/or requirement.

ACCESS TO RECORDS AND REPORTS

The Contractor shall permit and agree to cooperate with the authorized representatives of the CTA, including, but not limited to, the CTA's Inspector General and auditors, who may inspect and audit all data and records of the Contractor relating to the Contractor's performance and Subcontractor contracts under this Contract from the date of this Contract through and until the expiration of five years after completion of this Contract.

OTHER AGENCIES

Other local government agencies may negotiate their own agreements with the Contractor based on other terms and conditions in this Agreement. Other such agencies will issue their own contracts directly to the Contractor. Participation by other agencies shall have no adverse effect on the Authority. The Authority will not be responsible for any obligation due from any other agency to the Contractor. The Authority will have no liability for the acts or omissions of any other agency.

SPECIAL CONDITIONS (Continued)

SPECIFICATION NO. CTA 2011-0074A
DRAWING NOS. E-402; E-403; E-404; E-405; E-406; E-407;
E-408; E-409; E-410; & E-411
CONTRACT NO. C13RI101382206

PROMPT PAYMENT TO SUBCONTRACTORS

A) The Contractor is required to pay all Subcontractors for all work that the Subcontractor has satisfactorily completed, no later than 7 calendar days after the Contractor has received payment from CTA. All of the Contractor's contracts with its Subcontractors must state that the Subcontractor will receive payment within 7 calendar days of the date that the Contractor has received payment from CTA.

B) In addition, all Retainage amounts must be paid by the Contractor to the Subcontractor no later than 14 calendar days after the Subcontractor has, in the opinion of the Chief Infrastructure Officer, satisfactorily completed its portion of the Work. All of the Contractor's contracts with its Subcontractors must state that the Subcontractor will receive payment of Retainage within 14 calendar days of the date that the Subcontractor has, in the opinion of the Chief Infrastructure Officer, satisfactorily completed its portion of the Work.

C) A delay in or postponement of payment to the Subcontractor requires good cause and prior written approval of the General Manager, Purchasing.

D) The Contractor is required to include, in each subcontract, a clause requiring the use of appropriate arbitration mechanisms to resolve all payment disputes.

E) CTA will not pay the Contractor for work performed unless and until the Contractor ensures that the Subcontractors have been promptly paid for the work they have performed under all previous payment requests, as evidenced by the filing with CTA of lien waivers, canceled checks (if requested), and the Contractor's sworn statement that it has complied with the prompt payment requirements. Prime Contractors must submit a prompt payment affidavit, (form to be provided by CTA) which identifies each subcontractor (both DBE and non-DBE) and the date and amount of the last payment to such subcontractor, with every payment request filed with CTA, except for the first payment request, on every contract with CTA.

F) Failure to comply with these prompt payment requirements is a breach of the Contract which may lead to any remedies permitted under law, including, but not limited to, Contractor debarment. In addition, Contractor's failure to promptly pay its Subcontractors is subject to the provisions of 50 ILCS 505/9.

ADDENDUM 1

PROPOSAL

SPECIFICATION NO. CTA 2011-0074A
DRAWING NOS. E-402; E-403; E-404; E-405; E-406; E-407;
E-408; E-409; E-410; & E-411
CONTRACT NO. C13RI101382206

By execution of this Proposal, the undersigned offers, in accordance with the terms of the Contract Documents of which this Proposal is a part, to furnish and deliver a complete Power Control System required to distribute power to the existing stinger equipment located at CTA's 98th Street Rail Shop as detailed below, F.O.B. Destination, as described in these General and Special Conditions and Detail Specification CTA 2011-0074A, Drawing No. E-402; E-403; E-404; E-405; E-406; E-407; E-408; E-409; E-410 & E-411, at the firm delivered price as stated below.

LUMP SUM TOTAL DELIVERED PRICE TO FURNISH ONE (1) COMPLETE POWER CONTROL SYSTEM TO DISTRIBUTE POWER TO EXISTING STINGER EQUIPMENT LOCATED AT CTA'S 98TH STREET RAIL SHOP, INCLUDING ALL RELATED ACCESSORIES, COMPONENTS & FEATURES REQUIRED AS STATED IN THE DETAIL SPECIFICATION AND ASSOCIATED DRAWINGS:

$ _____

NAME OF COMPANY BIDDING: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

PERSON TO CONTACT: _____ PHONE NO: _____

E-MAIL ADDRESS: _____

TERMS: DISCOUNT: _____% _____ DAYS, NET _____ DAYS

"VENDORS"

cta MEETING ATTENDANCE

Subject: CIBRI 10138220 Power control system for stinger equip. @ 98th St.

Date 4-23-13 Time 9:00 AM Location 5067 W. Lake

NAME	AFFILIATION/POSITION	PHONE NO.
Bill Gunn	Illinois Switchboard Engineer	630-543-0910 x452
Ed Zastawny	Illinois Switchboard Engineer	630-543-0910 x12
Tyler Jonasen	Gus Berthold Project Engineer	312-243-5767

"CTA PERSONNEL"

cta MEETING ATTENDANCE

Subject: C13RI101382206 Power control system for stinger equip @ 98th Street

Date 4-23-13 Time 9:00 AM Location 567 W. Lake

NAME	AFFILIATION/POSITION	PHONE NO.
Greta Harris	Purchasing	(312) 681-2463
Sunish Mathew	CTA	x13869
Biju Jose	CTA	3125563546
Bob Blankenstein	CTA	773-722-4568
Joe Simmons	CTA	773-722-4644